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I N D E X

Page

WITNESSES ON BEHALF OF THE PLAINTIFF

DENNIS COOKE, PH.D.

Continued Cross-Examination by Mr. McDaniel	7602
Cross-Examination by Mr. Green	7648
Voir Dire Examination by Mr. Page	7672
Voir Dire Examination by Mr. Green	7686
Continued Voir Dire Examination by Mr. Page	7689
Cross-Examination by Mr. Elrod	7692
Redirect Examination by Mr. Page	7695

1 Tuesday, December 8, 2009

2 * * * * *

3 THE COURT: Ms. Xidis, how are we doing
4 on our situation that we discussed last night?

5 MS. XIDIS: Your Honor, yesterday
6 evening we received some cuts from the Tyson
7 attorneys. We're now down to about 140 exhibits.

8 THE COURT: All right. Well, that's
9 progress.

10 Part of the problem, as Mr. Green mentioned,
11 and as I'm sure that he's unaware obviously of how the
12 court's going to rule, or the court's unaware of how
13 it's going to rule, on whatever motions they raise at
14 the end of plaintiff's case as to certain elements of
15 the case. I suspect that has something to do with it.

16 Right, Mr. Jorgensen?

17 MR. JORGENSEN: That's right, Your
18 Honor. There's a couple of witnesses left to go in
19 the case and then the motions. So we really are
20 trying to cut deeply, but we do have to hedge a little
21 bit for just what might come up.

22 MS. XIDIS: And I guess just for way of
23 perspective, thus far in the case there have been
24 roughly 300 exhibits admitted and we're at 140 here.
25 So I think this is still pretty unrealistic and --

1 THE COURT: I've got a whole lot more
2 than 300 here behind me.

3 MS. XIDIS: Admitted thus far, Your
4 Honor.

5 I guess my concern is just that this is not
6 really the spirit and the purpose of the 72-hour
7 disclosure and they've cut this back, but they're now
8 kind of at what they wanted point as our worst
9 example, in which we've admitted were overly ambitious
10 first disclosures on our part.

11 So I guess we would ask that we hope this
12 isn't a precedent for the oncoming disclosures as we
13 would move forward, and we hope that we'll get some
14 real disclosures, which will enable us to prepare
15 better, also to help work through some of the 1006
16 issues we're now facing on the defense side.

17 THE COURT: Well, as I said before, the
18 judge that I worked for here in this very courtroom
19 was always of the belief -- and he was a great trial
20 lawyer -- that any case, no matter how complex, could
21 be boiled down to ten or fewer documents. And
22 although that may not apply to this extraordinary
23 case, the same principle applies.

24 Many of the documents frankly that have been
25 admitted into evidence here are just unnecessary, just

1 totally unnecessary. So I'd urge Mr. Jorgensen to
2 keep that principle in mind and let's keep whittling.

3 MR. JORGENSEN: Yes, Your Honor.

4 MS. XIDIS: Thank you.

5 THE COURT: Thank you.

6 All right. Let's move. Mr. McDaniel.

7 MR. MCDANIEL: Good morning, Your Honor.

8 THE COURT: Good morning.

9 **CONTINUED CROSS-EXAMINATION**

10 **BY MR. MCDANIEL:**

11 Q. Good morning, Dr. Cooke.

12 A. Good morning.

13 Q. Just to get us back in the mood, I just want
14 to remind us all, your opinion is that phosphorus
15 loading is the problem with Lake Tenkiller and it's
16 phosphorus that's driving eutrophication and algae
17 growth; right?

18 A. Not exactly. It's not only phosphorus
19 loading, but water loading as well, and phosphorus is
20 driving eutrophication.

21 Q. All right. In your opinion, the level of
22 phosphorus in Lake Tenkiller is much higher than it
23 should be?

24 A. Yes.

25 MR. MCDANIEL: May I approach, Your

1 Honor?

2 THE COURT: You may.

3 Q. (BY MR. MCDANIEL) Dr. Cooke, I've handed you
4 what's been marked for identification as Defendants'
5 Joint 707. Can you identify this four-page group of
6 documents here?

7 A. What do you want me to do?

8 Q. Can you identify -- well, let's do it this
9 way.

10 Do you recognize this as e-mail
11 communications between yourself and Dr. Jones
12 pertaining to the work on this case?

13 A. Yes.

14 Q. And these are a series of e-mails that you
15 produced with your considered materials as evidenced
16 by the Bates numbers at the bottom of the page; is
17 that right?

18 A. Yes.

19 MR. MCDANIEL: All right, Your Honor.
20 I'll offer Defendants' Joint Exhibit 707.

21 THE COURT: Any objection?

22 MR. PAGE: No objection.

23 THE COURT: Defendants' 707 is admitted.

24 Q. (BY MR. MCDANIEL) All right. Dr. Cooke,
25 turn to the second page of the exhibit, if you would,

1 please. I want to start by asking about the message
2 from Dr. Jones to you that was dated December 18,
3 2007. Do you see that one? The first word is "TK."

4 A. I do.

5 Q. All right. Would you read aloud Dr. Jones'
6 message to you?

7 A. "We are doing what we can with the data we've
8 got."

9 Q. No. I'm sorry, sir.

10 A. I'm sorry. I'm in the wrong place then.

11 Q. Yes, you are. If you'll move down the page
12 to the message on December 18th at 2:25 p.m. I should
13 have been more specific.

14 A. Okay. I have it.

15 Q. Okay. Read that one, please.

16 A. "TK has about the P that one would expect in
17 an Ozark reservoir of its size and hydrology, perhaps
18 a bit on the high side but not enough information to
19 show that. The N values bewilder me but Burt and
20 Roger were to have made a final determination - I have
21 not seen anything that we can run with."

22 Q. All right. Move up the page and read aloud
23 your response to him just a few minutes later.

24 A. "Jack: Just to clarify your e-mail, are you
25 saying that TK P concentration is what you would

1 expect without chickens - that litter has had no
2 impact on concentration? If so, what are we doing
3 here?"

4 Q. And how did Dr. Jones respond to your
5 question? Move up.

6 A. "We are doing what we can with the data we've
7 got. The fig above is Fig 4 from the 2004 CJFAS
8 paper" --

9 Q. I'm sorry. You can stop there. It was just
10 the first sentence I wanted you to read.

11 A. Okay.

12 Q. "We're doing what we can with the data we've
13 got."

14 And when he says "the data we've got," this
15 message is at the end of 2007 and your expert report
16 includes analysis of data through 2007; correct?

17 A. Yes.

18 Q. Okay. Now, Dr. Jones expressed some concerns
19 about what the data was showing in this project,
20 didn't he?

21 A. It appears that he did.

22 Q. Let's turn to the first page of the exhibit.
23 And Dr. Jones writes to you on December 17th, 2007,
24 and he says, "You decide about the TK 04 plot. I
25 think it might be presented at text and make the same

1 point. This finding somewhat undercuts the idea that
2 conditions are 'worse' because of litter application.
3 It points out that the confounding influence of
4 hydrology is a factor masking a simple,
5 straightforward interpretation."

6 Do you agree that those were his views in
7 December of 2007, Dr. Cooke?

8 A. That's what he wrote so I assume they're his
9 views.

10 Q. All right. And you and Dr. Jones also
11 discussed some problems with the quality and type of
12 data Dr. Olsen's group was providing for your use;
13 correct?

14 A. I don't recall. We'll have to -- I don't
15 know that.

16 MR. MCDANIEL: May I approach?

17 THE COURT: You may.

18 Q. (BY MR. MCDANIEL) All right, sir. I've
19 handed you what's been marked as Defendants' Joint
20 699, a three-page document.

21 Is that also some e-mail communications
22 between yourself and some communications with also
23 Dr. Welch pertaining your work in this project?

24 A. Yes. It appears so.

25 Q. All right.

1 MR. MCDANIEL: Your Honor, I offer
2 Defendants' Joint Exhibit 699.

3 THE COURT: Any objection?

4 MR. PAGE: No objection, Your Honor.

5 THE COURT: Defendants' 699 is
6 admitted.

7 MR. MCDANIEL: Your Honor -- excuse
8 me.

9 Q. (BY MR. MCDANIEL) Dr. Cooke, the very first
10 message at the top is a message from Dr. Jones to
11 Malena Foster, Dr. Welch, and yourself. Do you see
12 that --

13 A. Yes.

14 Q. -- on October 8th?

15 A. I do.

16 Q. Now, Malena Foster, is this the CDM employee
17 that was performing the computations for your report?

18 A. Yes.

19 Q. All right. Let's start with Dr. Jones'
20 message to you there on the first page on December
21 7th, 2007. Would you kindly read that entire message
22 into the record?

23 A. I think you mean October 7th?

24 Q. I did. I obviously misspoke.

25 A. "Denny and Gene, I'm concerned about the data

1 we are working with. I got a file from Robert showing
2 historical data from Tenkiller. Out of curiosity I
3 started looking through the information by date, year,
4 and section to see if the histograms that Malena
5 prepared squared with the data set. I was always a
6 bit curious about the 1992 TP value from Section 1 in
7 Tenkiller - it seemed high given the strong
8 longitudinal pattern. As you can see - the value in
9 the data set on 1 Aug is listed as 140 ug/L, but only
10 20 ug/L was measured at Sec 2. I suspect that value
11 is not correct - and may be 14 ug/L. Malena used this
12 value in the seasonal mean of 50 ug/L. Without it,
13 the average is only 28."

14 Q. Please continue.

15 A. "The data file gives detailed information on
16 Section 4 TP measurements. If I average values by
17 date across the season I come up with 219 ug/L for
18 this site in 1992, but Malena reports 75 ug/L. I
19 played around with the data and discovered that if I
20 delete the remarkably high values from the replicates
21 on each date from 1992 I can reproduce her value. Did
22 you know the data were screened this way?"

23 Q. Next paragraph, please.

24 A. "The other issue that we need to deal with is
25 the TKN value in Tenkiller."

1 Q. Can you pause there? Can you tell us what
2 TKN is?

3 A. Total Kjeldah nitrogen.

4 Q. All right. Proceed.

5 A. "I got excited when I found really high
6 nitrogen values relative to the" region "(Most Ozark
7 regions have about 500 ug/L TN" --

8 Q. Excuse me. Is that "Ozark reservoirs"?

9 A. -- "Ozark reservoirs have about 500 ug/L TN,
10 and the eastern OK reservoirs seem to be very
11 similar). The > 1 ug/L TKN value reported by Malena
12 struck me as a potential impairment - nitrogen from
13 litter seemed like an explanation. But, when I review
14 the historic TKN values they are in line with the
15 region - what's going on? Is CDM getting bad lab
16 data? Historic data shows Broken Bow has about 350
17 ug/L TKN. Jack."

18 Q. All right. Thank you for that.

19 Dr. Cooke, did you also share Dr. Jones'
20 concerns about bad data?

21 A. What we're seeing here is the normal
22 give-and-take between scientists and the vetting of
23 data.

24 Q. Can you answer my question, sir?

25 A. And so -- I'm going to answer your

1 question -- and so in doing so we're curious about
2 every number. And yes, I had concerns about their
3 nitrogen numbers.

4 Q. All right. Turn to the next page of the
5 exhibit, and I want to direct your attention to
6 Dr. Jones' message to you on November 8th, 2007. And
7 in the second paragraph, he states, "I hate to get
8 started with much until I know more about the TN
9 values."

10 Is that total nitrogen, "TN"?

11 A. Yes.

12 Q. "I sent a note about my concern but have no
13 response. I'm not willing to toss the CDM data
14 without input. The CDM folks put their collective
15 heads down when the discrepancy was pointed out."

16 Now, would you read the first three sentences
17 of your response to that at the top of the page?

18 A. "I have heard nothing about the TN problem.
19 I have also been questioning the TOC/DOC data, where
20 DOC is consistently higher than TOC. No answer to
21 that either."

22 Q. Okay. You can stop there.

23 Now, briefly tell us, what is TOC and DOC?

24 A. TOC is total organic carbon, and DOC is
25 dissolved organic carbon.

1 Q. Now, the TOC and DOC levels, to which of your
2 opinions are they relevant?

3 A. These opinions were relevant to the
4 disinfection byproduct portion of the report.

5 Q. All right. Let's go to the third page of the
6 exhibit. I'd like to ask you, sir, if you will
7 read -- and if your voice is cracking like mine, I'll
8 be glad to read. You just let me know.

9 A. Thank you.

10 Q. I want to ask you to read your message to
11 Dr. Jones on November 29th, 2007, the one at the
12 top?

13 A. "Jack: I don't know what the CDM values
14 mean. I am assuming that you infer that their quality
15 is suspect. Probably true. However it's what we
16 have. Roger wrote recently that the DOC values are
17 out - he finally agreed that the filters were bad,
18 just as I had been telling him. So, I don't know what
19 it means, but I am using the N:P as one of the
20 evidences of P limitation as stations 01 and 02. 03
21 and 04 are mixed, probably both N and light being
22 limiting at times. P concentration at 03 and 04 is
23 high to very high. I'm in a mood to get this done and
24 do it with what they have given us. I am going to
25 defer all questions about methods to Roger if it comes

1 up at deposition time. I asked him to prepare a
2 methods section for the report and all he came back
3 with was to cite the SOP manual. I have never seen
4 that. Have you? And in any case, it won't do. Hope
5 you are enjoying your trip. MO/OK game Saturday
6 night."

7 Q. That's the Missouri/Oklahoma game, I presume.
8 That's important.

9 A. It is.

10 Q. Sir, did Dr. Olsen admit to you that the
11 dissolved organic carbon data was bad?

12 A. I'm having difficulty recalling what he said,
13 but I do know that we discussed those data.

14 Q. Well, your message indicates on November 29th
15 your belief at that time was that Roger told you that
16 the DOC values are out and he admitted that the
17 filters were bad. That was your knowledge at that
18 time; do you agree?

19 A. I remember that, yes. He agreed with my
20 earlier comment about it.

21 Q. I'm trying to understand part of your point
22 here, Dr. Cooke, in this message.

23 You indicate that you believe the data's
24 probably suspect, but given that it's all that you
25 have, you told Dr. Jones that you were just inclined

1 to get the job done with what you had; correct?

2 A. What I said was that we're inclined -- I was
3 inclined to get the job done with what I had, which
4 would mean the DOC data were out and I had total
5 organic carbon data which were not influenced by the
6 filters.

7 Q. All right. But was not having good data on
8 dissolved organic carbon and total organic carbon, was
9 that making it difficult for you to fulfill your
10 assignment here?

11 MR. PAGE: Your Honor, I object. That
12 mischaracterizes the testimony of the witness. The
13 witness testified the data that he threw out that was
14 bad was dissolved, did not include total organic
15 carbon --

16 THE COURT: Sustained. Rephrase,
17 please.

18 Q. (BY MR. MCDANIEL) Were you, Dr. Cooke,
19 having a problem getting good dissolved organic carbon
20 and total organic carbon data so that you could
21 fulfill your assignment here?

22 A. Yes.

23 MR. MCDANIEL: May I approach?

24 THE COURT: You may.

25 Q. (BY MR. MCDANIEL) Dr. Cooke, I've handed you

1 what's been marked for identification as Defendants'
2 Joint 708, a two-page document.

3 Are these some more e-mails between yourself
4 and Dr. Jones relating to the work in this case?

5 A. Yes.

6 Q. And you produced these as part of your
7 considered materials; correct?

8 A. Yes.

9 MR. MCDANIEL: Your Honor, I'll offer
10 Defendants' Joint Exhibit 708.

11 THE COURT: Any objection?

12 MR. PAGE: No objection, Your Honor.

13 THE COURT: 708 is admitted.

14 Q. (BY MR. MCDANIEL) All right. Dr. Cooke, I
15 want to direct you to the message that's at the bottom
16 of the page -- begins at the bottom of the page from
17 you to Dr. Jones October 19th, 2007, at 10:58 a.m.

18 Are you there, sir?

19 A. Yes.

20 Q. Would you please read that message into the
21 record, and it continues over to the second page?

22 A. "Gene, Jack: I just learned from Roger and
23 Drew (separate e-mails) that they apparently did not
24 sample edge of field runoff from any field that did
25 not have litter applied to it. I thought that we had

1 been explicit about the need for reference samples.
2 This is going to make the interpretation of the THM
3 data even more complicated. I don't know whether it
4 affects anything that either of you is working on."

5 Q. All right. Now, move up and read Dr. Jones'
6 response to you at 11:41 a.m.

7 A. I have 11:49 a.m. Oh, I see it, 11:41.
8 "Interesting experimental design! It complicates
9 comparative analyses somewhat."

10 Q. All right. Then what was your response at
11 11:49?

12 A. "Yes. For example, how can we prove that the
13 BOD in TK is at least partially from organics in the
14 litter? Unless I am mistaken (a common occurrence)
15 all that we have now is the so-called 'chicken
16 signature' from some sort of DNA analysis. And that
17 type of analysis does not show magnitude. Any ideas?
18 Guess who was in charge of the field work that has
19 produced this dilemma?"

20 Q. All right. In your first phrase there, "how
21 can we prove the BOD in TK is at least partially from
22 organics in the litter," what is "BOD"?

23 A. Biological oxygen demand.

24 Q. And "TK" is Lake Tenkiller?

25 A. Tenkiller, yes.

1 Q. Sir, at this point, are you reflecting that
2 you viewed the objective of your work at this phase of
3 the investigation was to prove that Tenkiller is
4 impaired at least partially from the organics in
5 litter?

6 A. We were asking that question, or attempting
7 to ask that question.

8 Q. I note that you didn't say that you needed
9 this data to determine what was impairing Tenkiller,
10 rather it infers that your charge was to prove that it
11 was litter; is that correct?

12 A. Well, the response is directed to litter. We
13 recognize that there's other sources of organic
14 matter.

15 Q. All right. Let's move up the page, sir, and
16 Dr. Jones' response to you at 12:25 p.m. Would you
17 read his message, please?

18 A. The Chief scientist on this effort. I have
19 no idea how to solve this . . . except to look for
20 cross-system increases with application rates and
21 extrapolate back to the intercept. That is an
22 approach to science that is akin to kissing your
23 sister.

24 Q. Yikes. Okay. The comments about "the Chief
25 scientist," I assume you're referring to Dr. Olsen; am

1 I correct?

2 A. Yes.

3 Q. Now, I detect from this dialogue, Dr. Cooke,
4 that both you and Dr. Jones were being rather
5 sarcastic to your references to Dr. Olsen?

6 A. We were frustrated, yes, and I think
7 sarcastic possibly.

8 Q. And you'd have to admit that this does not
9 sound like either of you were very impressed with the
10 chief scientist at that point in time?

11 A. All I can say is we were having difficulty
12 getting answers to our questions.

13 Q. Now, would you read your response at the top
14 of the page, sir, at 3:08 p.m.?

15 A. "Wow! I thought I would stump you with that
16 question. Guess not. I don't have a sister, but if I
17 did, kissing her might not be very high on my list of
18 things to do.

19 "Seriously, this is a major problem for us,
20 in my opinion. The P loading we can make a good
21 argument because the sources are limited and we can
22 eliminate wastewater as a major source apparently.
23 But organic matter loading goes right to the injury to
24 fish and drinking water. Please keep thinking on it
25 and maybe there's a way. I put it back to Roger by

1 e-mail this morning, asking him if he could think of a
2 way to determine percent organic matter from litter.
3 We'll see what he says."

4 Q. Now, at the moment, Dr. Cooke, were you
5 stumped about how to make your argument tying litter
6 to the organic material in the lake?

7 A. That's what that says.

8 Q. And it reflects that you were determined to
9 find a way?

10 A. It says that we're -- we're attempting to
11 find a way.

12 Q. So, Dr. Cooke, there was a problem in the
13 experimental design, in that runoff samples had not
14 been collected from fields where litter had not been
15 applied at this time?

16 A. From my understanding from Dr. Olsen, he had
17 not done that.

18 Q. Now, eventually you did receive a couple of
19 purported reference runoff samples; correct?

20 A. Yes.

21 Q. Isn't it true that at the time you submitted
22 your expert report and gave your deposition, you
23 didn't possess any data or evidence to defend that the
24 reference samples provided to you adequately represent
25 all of the nonlitter-applied lands in the Illinois

1 River Watershed?

2 A. That's quite a question, sir. Could you kind
3 of break it up?

4 Q. At the time you submitted your report, you
5 did not have any data or evidence that would allow you
6 to conclude that those couple reference samples
7 adequately represented all of the nonlitter-applied
8 fields in the Illinois River Watershed?

9 A. We didn't have that, that's right.

10 Q. I gather from the e-mail message, another
11 part of the phosphorus strategy was to find a way to
12 eliminate all the sewage plants as a source; is that
13 correct?

14 A. I don't read it that way. That certainly
15 wouldn't be the intent. You understand, I'm thinking
16 back two years -- more than two years ago. At the
17 time we were writing the report so I --

18 Q. If my interpretation wasn't correct, you can
19 just tell me that's not your reading.

20 A. Okay.

21 Q. Is it true, Dr. Cooke, that you were directed
22 by Mr. Page to stop discussing problems with the work
23 in your e-mail communications?

24 A. I don't recall that.

25 MR. MCDANIEL: May I approach?

1 THE COURT: You may.

2 Q. (BY MR. MCDANIEL) All right. Dr. Cooke,
3 what I've handed you is marked for identification as
4 Defendants' Joint 694. You recognize this as an
5 e-mail from you to Dr. Jones copied to Dr. Welch on
6 December 7th, 2007?

7 A. Yes.

8 MR. MCDANIEL: Your Honor, I offer
9 Defendants' Joint Exhibit 694.

10 THE COURT: Any objection?

11 MR. PAGE: No objection.

12 THE COURT: Defendants' 694 is
13 admitted.

14 Q. (BY MR. MCDANIEL) All right. Dr. Cooke, the
15 second paragraph of the message, please read that
16 aloud into the record.

17 A. "Dave Page has warned me again about using
18 e-mails to discuss such things. I am deleting a lot
19 of stuff where the three of us have mentioned flaws in
20 the work, etc. Maybe you'd should call me about this.
21 I want to know whether we can use these graphs to
22 support the idea that stations 01 and 02 are P
23 limited. I agree that we can use them in the sense
24 that we argue the reduction of P concentration should
25 lead less chlorophyll. It's crunch time on the report

1 so would be grateful for a reply. Thanks."

2 Q. Dr. Cooke, do you agree with me that a
3 scientist conducting an unbiased study does not delete
4 information concerning problems proving the
5 hypothesis?

6 A. Not at all. I don't agree with you.

7 Q. Now, one important part of the opinions you
8 expressed on direct is based upon your comparison of
9 Tenkiller to Broken Bow Reservoir; correct?

10 A. Yes.

11 Q. All right. What is the -- what's the common
12 name for the watershed where Broken Bow sits?

13 A. Mountain Fork.

14 Q. Okay. And I understand you contend that
15 Broken Bow provides an example what the water quality
16 would look like in Tenkiller if there had never been
17 poultry litter used in the Illinois River Watershed;
18 is that correct?

19 A. Not exactly.

20 Q. The primary attributes that led to your
21 selection of Broken Bow as the reference lake were its
22 size, its location in the same ecoregion, and the fact
23 that phosphorus inputs were low?

24 A. Those were very important characteristics.

25 Q. In fact, Dr. Cooke, don't you consider the

1 phosphorus concentrations in the Mountain Fork River
2 feeding Broken Bow to be what should be expected from
3 an unimpaired Ozark Highlands stream?

4 A. They're pretty close.

5 Q. Now, prior to the time that you issued your
6 report, you'd never visited Broken Bow Reservoir or
7 the Mountain Fork Watershed, had you?

8 A. No.

9 MR. MCDANIEL: May I approach, Your
10 Honor?

11 THE COURT: Yes, sir.

12 Q. (BY MR. MCDANIEL) Dr. Cooke, I want to talk
13 to you about the concept of identifying a control or a
14 reference in order to isolate the effect of the
15 variable, and I have created this little demonstrative
16 for us to use as a tool during the discussion. If we
17 can look at the first page.

18 If you're going to study a subject and you
19 want to know the effect of only one of the
20 variables -- and I'm calling it "variable A"
21 here -- then you want to select a control that is
22 comparable in all respects except variable A is
23 absent. Would that be the ideal?

24 A. That would be the ideal in laboratory
25 situations.

1 Q. Okay.

2 A. Not in field situations.

3 Q. I understand. Now, in this case, the
4 objective was to determine the effect of poultry
5 litter use on the water quality of Lake Tenkiller,
6 that was the broad issue; do you agree?

7 A. Yes.

8 Q. Would you agree then that the variable is the
9 land use of utilizing poultry litter on pastures in
10 the Illinois River Watershed?

11 A. That seems to be the principle variable
12 here --

13 Q. Okay.

14 A. -- but not the only variable.

15 Q. All right. Well, let's go to the next page
16 in the demonstrative.

17 So what I've done here is I've attempted to
18 take the general concept and flesh it out to the type
19 of study at hand; that is, looking at a reservoir to
20 determine the effect of litter application land use in
21 the watershed.

22 Now, what I'm showing here in this
23 demonstrative -- and this is Tyson Demonstrative
24 237 -- what I'm showing here is a partial list of
25 reservoir and watershed characteristics. And I

1 haven't necessarily attempted to list them all, but
2 this is some of the ones that came to mind to me that
3 I want to talk to you about.

4 So some of the characteristics, litter
5 application being the variable of interest, but other
6 potential variables would include point sources; do
7 you agree, sir?

8 A. I agree.

9 Q. The amount of forest versus pasture
10 acreage?

11 A. No.

12 Q. You don't agree to that?

13 A. No.

14 Q. How about the presence of cattle?

15 A. No.

16 Q. How about the presence of swine?

17 A. No.

18 Q. How about the human population?

19 A. No.

20 Q. How about the watershed to reservoir area?

21 A. No.

22 Q. How about the age of the reservoir?

23 A. That possibly could be a variable that should
24 be comparable.

25 Q. How about residence time?

1 A. Be nice if they're comparable.

2 Q. All right. These factors where you answered
3 "no" to me -- point sources, cattle, swine, humans --
4 you agree all those are potential contributors of
5 nutrient loading or phosphorus loading into the waters
6 of the watershed, don't you, sir?

7 A. They could be.

8 Q. Okay. Let's take this to the next step.
9 Let's show the next page of the exhibit.

10 MR. MCDANIEL: And I want to point out
11 for the court and the state's counsel that on the
12 cited references at the bottom, I just spotted a
13 mistake. Everywhere it makes a reference to "Wells
14 Depo," that should be "Dr. Welch's Depo." I apologize
15 for that.

16 Q. (BY MR. MCDANIEL) All right. I want to
17 flesh out this comparison chart even further by adding
18 the information that you have about the two reservoirs
19 and watersheds.

20 Now, let's look at litter application. We
21 know there's litter applied in the Illinois River
22 Watershed. Now, how about the Mountain Fork Watershed
23 feeding Broken Bow; what do you know about litter
24 application in that watershed?

25 A. Well, I know there's around 200 poultry

1 houses there so there may well be some litter
2 application, but -- let me finish -- the percent of
3 pasture there is small. So relative to the percent of
4 pasture to Broken Bow, there may not be a lot of
5 litter.

6 MR. MCDANIEL: May I approach, Your
7 Honor?

8 THE COURT: Yes, sir.

9 Q. (BY MR. MCDANIEL) Now, Dr. Fisher provided
10 you some information about poultry operations in the
11 Mountain Fork Watershed, did he not?

12 A. Yes.

13 Q. All right. What I've handed you is marked
14 for identification as Defendants' Joint 5654. Would
15 you identify that?

16 A. It looks like it's a map of the Mountain Fork
17 River Watershed poultry house count.

18 Q. All right. And the X's, did you understand
19 this to represent poultry houses?

20 A. I frankly don't recall his -- his map.

21 Q. Is this the information you received from
22 Dr. Fisher?

23 A. Same answer: I just don't recall what was in
24 that report in terms of figures.

25 Q. All right. This document says poultry house

1 count 292. Is that consistent with your recollection?

2 A. That number -- for me, I had a number of 218
3 but we're close.

4 Q. All right. Did he represent to you that many
5 of the poultry houses in the Mountain Fork Watershed
6 were actually clustered along the river feeding Broken
7 Bow Reservoir, or was that an observation you made
8 yourself?

9 A. That was an observation that I made in
10 conversation with him.

11 Q. All right. I gather that you don't have any
12 specific information about how much poultry litter is
13 land-applied each year in the Mountain Fork Watershed,
14 do you, sir?

15 A. I do not.

16 Q. And despite your own observation that poultry
17 houses are clustered along the Mountain Fork River,
18 you still consider the water quality of the river to
19 be relatively unimpaired; correct?

20 A. The concentration of total phosphorus in the
21 river averages 27 micrograms, and that's very, very
22 close to its ecoregional potential. So yes, it's
23 unimpacted by poultry litter.

24 Q. Okay. Let's go back to the Demonstrative
25 237.3, please. Next on my list is poultry sales.

1 (Discussion held off the record)

2 MR. MCDANIEL: May I approach again,
3 Your Honor?

4 THE COURT: Yes, sir.

5 Q. (BY MR. MCDANIEL) Dr. Cooke, what I've
6 handed you is Bates-stamped CookeWelch00001342.0001.

7 Do you recognize this from your considered
8 materials?

9 A. Yes.

10 Q. It's a table where you have a multitude of
11 attributes that you have answered for a number of
12 different reservoirs apparently that you or you and
13 Dr. Welch looked at?

14 A. Yes.

15 Q. Okay. This is what -- at the bottom of the
16 Tyson Demonstrative 237.3, where I refer to the
17 watershed comparison chart --

18 A. Yes.

19 Q. -- that's what I'm referring to, sir. And I
20 wanted you to have it so you could refer to it to
21 check the numbers that I put on the demonstrative.

22 So the 2002 poultry sales in the Illinois
23 River Watershed was -- you report almost 114 million,
24 that's the information you had --

25 A. Yes.

1 Q. -- is that right?

2 And the information you had is something just
3 shy of 31 million birds sold in 2002 in the watershed
4 for Broken Bow?

5 A. Yes.

6 Q. Okay. So based upon this information in
7 2002, the Illinois River Watershed has on the order of
8 three and a half times as much poultry production as
9 the Mountain Fork by your numbers; do you agree?

10 A. Yes.

11 Q. All right. Next on my list are sewage plants
12 or point-source discharges. The Illinois River
13 Watershed has around ten and the Mountain Fork has
14 just two tiny ones; do you agree?

15 A. Yes.

16 Q. Do you know how many millions of gallons per
17 day of wastewater are discharged into the streams of
18 the Illinois River Watershed by the sewage plants in
19 the watershed?

20 A. I know it only as pounds of phosphorus and
21 not in terms of volume.

22 Q. Well, do you recall Dr. Engel's estimate on
23 that?

24 A. No.

25 Q. All right. Let's look at table 6.5 of

1 Dr. Engel's report, which she's going to blow it up
2 for you, Dr. Cooke.

3 A. Thank you.

4 Q. Table 6.5, do you see that, sir, on your
5 monitor?

6 A. Yes.

7 Q. Do you recall reviewing that information when
8 you looked through his report?

9 A. I recall seeing this.

10 Q. Do you accept Dr. Engel's estimates related
11 to the sewage plants in the Illinois River Watershed?

12 A. I didn't use these values. We used other
13 data for this.

14 Q. All right. Do you accept his values as being
15 reasonable?

16 A. I cannot comment on that because we never
17 looked at volume; we looked at pounds or kilograms of
18 phosphorus.

19 Q. All right. Well, let's -- then let's just at
20 least identify what his estimates were. Let's go down
21 the list here.

22 He's got Springdale at 12.4 million gallons
23 per day; correct?

24 A. Yes.

25 Q. Siloam Springs at basically 2.7 million

1 gallons per day; right?

2 A. Yes.

3 Q. The Fayetteville Noland plant at essentially
4 5.2 millions of gallons per day?

5 A. Yes.

6 Q. Rogers at 5.7 million gallons her day;
7 right?

8 A. Yes.

9 Q. Lincoln at .4 million gallons per day?

10 A. Okay.

11 Q. Prairie Grove at .3 million gallons per day?

12 A. Okay.

13 Q. Tahlequah at 2.7 million gallons per day?

14 A. Okay.

15 Q. Stilwell at .8 million gallons a day?

16 A. Okay.

17 Q. Westville at .1 million gallons per day?

18 A. Okay.

19 Q. And Gentry at .4?

20 A. All right.

21 Q. All right. When I add this list up, I've got
22 30.77 million gallons per day for these ten
23 dischargers. Can you accept my addition?

24 A. Yes, I will.

25 Q. Okay. And his figure, just to be clear, it's

1 wastewater-treatment plant water discharges since
2 2003, just for the record to be clear what his table
3 says.

4 So there's almost 31 million gallons of
5 wastewater per day discharged into the streams of the
6 Illinois River Watershed; do you agree?

7 A. Yes.

8 Q. Now, the two sewage plants in the Mountain
9 Fork are putting out about a tenth of a million
10 gallons per day; do you agree?

11 A. I have no information on that, unless it's in
12 this chart somewhere.

13 *(Discussion held off the record)*

14 Q. *(BY MR. MCDANIEL)* Dr. Cooke, while we're
15 giving the court just a moment here, in your December
16 4th, 2008, deposition, turn to page 116, please.

17 A. 116, sir?

18 Q. Yes, sir.

19 A. Okay.

20 Q. All right. Beginning on line 24, the
21 question was, "Can you tell me the number and size of
22 sewage treatment facilities that are present in the
23 Illinois River watershed compared to the number in the
24 Broken Bow watershed?"

25 Your answer: "The Broken Bow watershed has

1 two tiny wastewater treatment facilities. They're
2 putting out less than one MGD, less than a tenth of a
3 MGD. They're very tiny. In the Illinois River
4 watershed, there are ten wastewater treatment plants."

5 Q. Do you recall that testimony now, sir?

6 A. If it's on here, I said it.

7 Q. All right. So if your testimony is that the
8 Mountain Fork sewage treatment plants are putting out
9 a tenth or less of a million gallons per day, that
10 would mean that the wastewater output into the
11 Illinois River stream system is on the order of 307
12 times higher than the Mountain Fork stream system; do
13 you agree?

14 A. I'll accept your arithmetic.

15 Q. All right. Let's go back to the
16 Demonstrative 237.3.

17 A. A moment, sir. Can I put this back?

18 Q. You can reassemble that and set it aside.
19 Thank you.

20 A. Go ahead.

21 Q. All right. Next on the list in the
22 demonstrative is the percent forest -- or the extent
23 to which the two watersheds are covered in forest.
24 Maybe that's a better way of putting it.

25 Do you agree, sir, with the general

1 proposition that the more forest in a watershed, the
2 less tendency to have issues with nonpoint-source
3 pollution?

4 A. The more forest --

5 Q. The more forest you have, the less tendency
6 to have issues with nonpoint-source pollution?

7 A. Yes.

8 Q. And forest as a land use is one of the lowest
9 contributors of nonpoint-source runoff?

10 A. Yes.

11 Q. All right. So the Illinois River Watershed
12 you report as 43 percent forest and the watershed for
13 Broken Bow is nearly twice that at 79 percent;
14 right?

15 A. Yes.

16 Q. So the Mountain Fork Watershed, Dr. Cooke,
17 it's largely undeveloped, isn't it?

18 A. That's correct.

19 Q. Now, there are significant differences in the
20 size of the cattle industry in these two watersheds;
21 do you agree?

22 A. Yes.

23 Q. According to your information, the 2002
24 cattle population in the Illinois River Watershed was
25 almost 213,000 head, whereas the Mountain Fork has

1 only 50,000 head. That was your information?

2 A. Yes.

3 Q. And that makes the cattle industry slightly
4 more than four times larger in the Illinois River
5 Watershed; right?

6 A. Yes.

7 Q. Okay. Now, the percentage of the watershed
8 covered with pasture is another relevant factor for
9 the potential contribution of nonpoint-source runoff;
10 correct?

11 A. Correct.

12 Q. Now, according to you, the Illinois River
13 Watershed is 45 percent pasture, whereas the Mountain
14 Fork is only 12 percent, or less than a third, of the
15 Illinois River Watershed's pasture coverage; do you
16 agree?

17 A. Yes.

18 Q. All right. Let's look at swine.

19 According to the information you have,
20 there's a large difference in the size of the swine
21 industry in the two watersheds; do you agree?

22 A. Yes.

23 Q. According to you, the hog sales in the
24 Illinois River Watershed are about 147,000 head per
25 year, whereas the sales in the Mountain Fork Watershed

1 are about 82,000 head?

2 A. Right.

3 Q. Do you know, sir, whether or not the typical
4 use for swine manure is land application for
5 fertilizer?

6 A. It can be.

7 Q. Do you know if that's typically how it's
8 used?

9 A. It's -- I don't believe it's typically how
10 it's used.

11 Q. Did you assess the extent to which swine
12 manure is used as a nutrient source for lands in the
13 Mountain Fork Watershed?

14 A. I did no work on the watershed.

15 Q. Okay. Now, according to you, the human
16 population in the Illinois River Watershed is nine and
17 a half times larger in the Illinois River Watershed
18 than it is in the Mountain Fork; do you agree?

19 A. Yes.

20 Q. So you've got 285,000 people in the Illinois
21 River Watershed and 30,000 people in the Mountain
22 Fork; right?

23 A. Yep.

24 Q. Now, I don't suppose there's much question
25 that humans, their habitats and activities, can have a

1 negative effect on water quality?

2 A. They certainly can.

3 Q. Now, the watershed area to reservoir surface
4 area ratio is another factor that scientists in your
5 field look at when assessing watersheds and lakes and
6 reservoirs; correct?

7 A. Yes.

8 Q. All right. You already testified that for
9 the Illinois it's 80 acres of land for every surface
10 acre of Lake Tenkiller; right?

11 A. Yes.

12 Q. Now, for Broken Bow, the ratio is less than
13 one-half that at 34 to 1; right?

14 A. Right.

15 Q. So that means in Broken Bow, there's only 34
16 acres draining to every surface acre of that
17 reservoir?

18 A. Yes.

19 Q. Would you agree then that as between the two
20 reservoirs, Broken Bow bears less than half of the
21 burden from runoff from the land surface in its
22 watershed than does Tenkiller?

23 A. That would have to be computed.

24 Q. All things being equal?

25 A. Well, you can't do all things equal because

1 they're not.

2 Q. There's a significant difference in the
3 amount of acreage draining into each surface acre of
4 each of those two reservoirs; you do agree with
5 that?

6 A. There's a significant difference in the area
7 draining, yeah, that's correct.

8 Q. All right. When we look at the age,
9 Tenkiller's 18 years older than Broken Bow; right?

10 A. Yes.

11 Q. In 2009, Tenkiller's 57 years old; right?

12 A. Yes.

13 Q. Older than some of us in here, younger than
14 some of us in here?

15 A. Younger than some of us in here, sir.

16 Q. Okay. Now, the residence time, now that's
17 another factor that can affect whether the reservoir
18 has phosphorus problems; right?

19 A. The age of it?

20 Q. No, sir. The residence time.

21 A. Oh, the residence time. I'm sorry. Yes.

22 Q. Okay. Now, you agree that Broken Bow has
23 approximately twice the residence time of Tenkiller?

24 A. Yes.

25 Q. Thus, the sediments and sediment-bound

1 phosphorus have a much greater opportunity to settle
2 out of the water column in Broken Bow than they do in
3 Tenkiller?

4 A. On average, that would be true.

5 Q. All right. Tell me, sir, what does it mean
6 for a reservoir to be dystrophic?

7 A. That would mean that the water has color to
8 it; that is, it has dissolved organic matter in it
9 that produces a color.

10 Q. Well, could it also mean that the water has
11 humic -- h-u-m-i-c -- humic acids in the water that
12 come from plant life around the reservoir?

13 A. Yes.

14 Q. And humic acids can come from evergreen
15 forests; correct?

16 A. They could.

17 Q. The Mountain Fork Watershed has a lot of
18 evergreen trees, whereas Tenkiller is surrounded by
19 deciduous forest; do you agree with that?

20 A. No.

21 Q. Which part of that don't you agree with?

22 A. Well, they have -- they each have some of
23 that kind of vegetation. Their climax vegetation
24 includes a pine forest --

25 Q. Is there a greater percent -- I'm sorry.

1 A. -- and oaks.

2 Q. Is there a greater percentage of evergreen
3 trees in the forest in the Mountain Fork Watershed
4 than there are in the Illinois River Watershed?

5 A. Yes.

6 Q. Now, as a consequence of the humic acids and
7 organic water -- excuse me -- as a consequence of
8 these humic acids and organic water, the water in a
9 dystrophic lake tends to be stained brown?

10 A. Yes.

11 Q. And dystrophic lakes do not tend to be highly
12 productive of algae, are they?

13 A. They can be highly productive, yes, they can.

14 Q. That wasn't my question. They do not
15 tend -- they're not typically high productive in
16 algae?

17 A. I don't know the answer to that; I simply
18 don't.

19 Q. Do you agree that Broken Bow is dystrophic?

20 A. No.

21 Q. You know that Tenkiller is not dystrophic;
22 correct?

23 A. Tenkiller is not dystrophic and Broken Bow
24 isn't either.

25 MR. MCDANIEL: May I approach, Your

1 Honor?

2 THE COURT: Yes. Is the term "humic
3 acids"?

4 MR. MCDANIEL: H-u-m-i-c.

5 THE COURT: All right. And is it clear
6 that evergreens tend to produce humic acid? Is that
7 correct?

8 THE WITNESS: I don't know that they do.

9 THE COURT: Oh, okay. All right. Thank
10 you.

11 Q. (BY MR. MCDANIEL) All right. Dr. Cooke,
12 what I've handed you is figure 14 from Dr. Horne's
13 report. Do you remember looking at these photographs?

14 A. Yes.

15 Q. And in particular -- I'm sorry.

16 (Discussion held off the record)

17 Q. (BY MR. MCDANIEL) In particular, I want to
18 draw your attention to the top two photos --

19 A. Okay.

20 Q. -- where Dr. Horne at least purports that he
21 took photos on the 1st and 3rd of October of 2008 off
22 the stern of a boat, on the left, Lake Tenkiller; and
23 on the right, Broken Bow.

24 Do you see an apparent difference in the
25 color of the water between the two reservoirs?

1 A. There is an apparent difference.

2 Q. With Broken Bow appearing brown?

3 A. Well, I don't see brown there but it
4 certainly is darker.

5 Q. All right. But you've never personally been
6 to Broken Bow and seen the color of the water?

7 A. No. I relied on the OWRB to do that.

8 Q. Dr. Cooke, despite the differences in these
9 two watersheds that we walked through here and the
10 differences in the reservoirs that we've discussed, do
11 you still maintain that Broken Bow represents what
12 Tenkiller would look like if there had never been a
13 poultry industry in the Illinois River Watershed?

14 A. It's pretty close. The only difference is
15 that there is a small percentage of phosphorus going
16 into Tenkiller from wastewater. That is a phosphorus
17 source but that is the only difference.

18 Q. Now, isn't a built-in assumption in your
19 answer that in your view if the poultry industry had
20 never developed any operations in the Illinois River
21 Watershed, you don't think that there would have been
22 a cattle industry developed and you don't think that
23 the watershed would have experienced deforestation?
24 Are those assumptions?

25 MR. PAGE: Objection; compound, Your

1 Honor.

2 THE COURT: Sustained.

3 A. I didn't make those assumptions.

4 Q. (BY MR. MCDANIEL) Just a second, sir. I
5 need to reask the question. He sustained the
6 objection.

7 Is it built in -- are you assuming, sir, that
8 if it had not been for the poultry industry, that the
9 cattle industry wouldn't be as widespread as it is in
10 the Illinois River Watershed?

11 A. I hadn't thought that way. We're thinking of
12 a different kind of question. The poultry industry
13 is, in fact, there and is the major contributor of
14 phosphorus to Tenkiller Reservoir. That's the
15 issue.

16 MR. MCDANIEL: Yeah, I move to strike
17 that last answer, Your Honor. There's no foundation,
18 what is the primary source. That wasn't covered on
19 direct.

20 THE COURT: Sustained.

21 Q. (BY MR. MCDANIEL) Does your assumption that
22 Tenkiller would look like Broken Bow assume that the
23 land uses in the two watersheds would be the same?

24 A. Close to the same.

25 Q. Which means there wouldn't be the extent of

1 deforestation in the Illinois River Watershed as has
2 occurred over its history since the dam was closed?

3 A. Well, I can answer that by saying the
4 deforestation in the Tenkiller watershed became
5 pastures which were then covered with chicken litter.

6 Q. That's my point, sir. In your mind, those
7 are all tied in together with the presence of the
8 poultry industry; isn't that true?

9 A. It's true. You're asking me if the poultry
10 industry wasn't there, would Tenkiller's watershed be
11 covered with trees? I can't know that.

12 MR. MCDANIEL: May I approach, Your
13 Honor?

14 THE COURT: Yes, sir.

15 Q. (BY MR. MCDANIEL) All right. Dr. Cooke,
16 I've handed you what's marked for identification as
17 Defendants' Joint 698, a six-page grouping of e-mails.

18 Do you recognize these as e-mails between
19 yourself and Dr. Jones and Dr. Welch relating to the
20 work in this project?

21 A. Yes.

22 MR. MCDANIEL: Your Honor, I offer
23 Defendants' Joint Exhibit 698.

24 THE COURT: Any objection?

25 MR. PAGE: May I just have a minute,

1 Your Honor, just to go through the pages?

2 THE COURT: Yes, sir.

3 MR. PAGE: No objection, Your Honor.

4 THE COURT: Exhibit 698 is admitted.

5 Q. (BY MR. MCDANIEL) All right. Dr. Cooke,
6 let's focus on the message from Dr. Jones to you and
7 Dr. Welch on December 14th, 2007, there on the very
8 first page.

9 Would you read Dr. Jones' message, please?

10 A. "These reservoirs are remarkably different.
11 The TK watershed has 43% forest, 45% grass and .14%
12 cropland. The BB watershed has 79% forest, 12% grass
13 and .03 cropland. Twice the forest and one-quarter
14 the grass explains a lot."

15 Q. Now, did Dr. Jones not approve of the choice
16 of Broken Bow as the reference watershed for this
17 project?

18 A. I don't recall that he disagreed about it at
19 all.

20 Q. Well, he did point out several of the major
21 differences in the two watersheds, just like what you
22 and I went through; correct?

23 A. Yes.

24 Q. His opinion he expressed here, is it true
25 that what his opinion was is that the difference in

1 the water quality between Tenkiller and Broken Bow
2 could largely be explained by the fact that the
3 Mountain Fork Watershed was mostly forest with little
4 pasture?

5 A. I don't see that in this message, and I know
6 he didn't mean to say it.

7 Q. All right. Let's turn back to Exhibit 707 in
8 front of you, please, Dr. Cooke. It's one of the
9 e-mails we went through at the beginning of the
10 morning. Let me know when you've found it.

11 A. Yes.

12 Q. All right. Turn to the second page, sir.
13 And the message at the top from Dr. Jones to you on
14 December 18th, 2007, at 3:59, the second paragraph
15 there, he says, "The fig above is Fig 4 from the 2004
16 CJFAS paper on land use and nutrients in Missouri
17 reservoirs. Simply put, high forest and low
18 nutrients. The BB situation is likely explained by
19 the massive amount of forest cover in the watershed."

20 Those were his words; correct?

21 A. Yes.

22 Q. So he reurged his point to you again in this
23 message four days later, and he stated that "the
24 (Broken Bow) situation is likely explained by the
25 massive amount of forest cover in the watershed."

1 That was his opinion at that time; correct?

2 A. Yes. The opinion means that there was a
3 small amount of pasture, which is where the litter is
4 applied.

5 MR. MCDANIEL: I move to strike as
6 nonresponsive.

7 THE COURT: Overruled.

8 Q. (BY MR. MCDANIEL) All right. You associated
9 with Dr. Jones on this project because he's an expert
10 in Ozark Highlands lakes; right?

11 A. I wouldn't say he's an expert in Ozark
12 Highlands lakes more than any other area. He's a
13 tremendous reservoir limnologist and he knows the
14 Midwest reservoirs.

15 Q. And he has studied Ozark Highlands
16 reservoirs, hasn't he, sir?

17 A. Yes, he has.

18 Q. Now, in these two messages from Dr. Jones to
19 you about Broken Bow, he didn't state in either of
20 these messages that the differences in water quality
21 could be explained by the use of poultry litter, did
22 he?

23 A. I don't know. I guess I could sit here and
24 read these but --

25 Q. The two that we went through where he

1 mentioned Broken Bow, he did not say that you could
2 explain the water quality as a function of poultry
3 litter use, did he, sir?

4 A. I don't recall. I don't see it here.

5 Q. Now, the fact of the matter is, Dr. Cooke, in
6 this investigation you've not compared the Illinois
7 River Watershed to any other Ozark Highlands watershed
8 that's comparable in all respects to the Illinois
9 River Watershed with the exception that there was no
10 poultry litter being used; correct?

11 A. Correct.

12 MR. MCDANIEL: I'll pass the witness.
13 Thank you for your patience. Thank you.

14 THE COURT: Further cross? Mr. Green.

15 MR. GREEN: Thank you, Your Honor.

16 **CROSS-EXAMINATION**

17 **BY MR. GREEN:**

18 Q. Good morning, Dr. Cooke. My name is Tom
19 Green, one of the lawyers representing Tyson.

20 A. Good morning to you.

21 Q. And I would just like to pick up with a
22 couple of questions on Broken Bow, since that's where
23 we were, and just show you what's been marked as
24 Defendants' Joint Exhibit 672.

25 MR. GREEN: May I approach, Your?

1 Honor.

2 THE COURT: Yes, sir.

3 Q. (BY MR. GREEN) And I'm going to apologize,
4 Dr. Cooke, for the -- the reproduction here is not
5 perfect.

6 A. I can read it, though.

7 Q. Okay. So can you tell us what you're looking
8 at there, sir?

9 A. It's an e-mail from me to Robert van
10 Waasbergen.

11 Q. Okay. And can you tell us who he is, please?

12 A. Van Waasbergen is an employee on this
13 project, a consultant on this project, for the
14 plaintiffs.

15 Q. All right. And this is an e-mail that you
16 sent him on Friday, September 28th, in the year 2007;
17 is that right?

18 A. Yes.

19 Q. And this concerns disinfectant byproducts,
20 trihalomethane levels that were detected in Broken
21 Bow; is that not right?

22 A. I haven't read it. May I?

23 Q. Sure.

24 A. Okay.

25 Q. All right. Is that correct that --

1 A. Yes.

2 Q. -- you're discussing trihalomethane values
3 found in Broken Bow?

4 A. Yes.

5 MR. GREEN: Your Honor, I move the
6 admission of Defendants' Joint Exhibit 672.

7 THE COURT: Any objection?

8 MR. PAGE: No objection.

9 THE COURT: 672 is admitted.

10 Q. (BY MR. GREEN) Would you be good enough,
11 sir, to read the beginning of that e-mail at the top
12 of the page that starts "Robert: Yes, this is more
13 manageable"? Can you read that message into the
14 record, please?

15 A. "Robert: Yes, this is more manageable though
16 it was too wide by one column and thus I have 32
17 pages. Thanks for making it smaller and thus more
18 useful.

19 "I am amazed at the very high THM values from
20 Broken Bow. That reservoir is supposed to be our
21 reference reservoir. What do we know about the
22 location of this utility - where river or some spot on
23 the reservoir do they get their water? Now that we
24 have obtained these data, it is likely that we will
25 have to use them. We need to find an explanation for

1 this. Maybe the utility does not do a good job of
2 treating water. I wonder what type of plant they
3 have. Is this type of inquiry within your scope of
4 expertise and assignment. I ask that because the
5 confusion level is high regarding who is doing what."

6 Q. And you signed it "Denny"; right?

7 A. Yes, correct.

8 Q. Okay. Now, you never came up with an
9 adequate explanation for this very high level of
10 trihalomethane, and so you just attributed that to
11 operator error at the water utility; isn't that right,
12 Doctor?

13 A. No. We did come up with an explanation for
14 it.

15 Q. You did?

16 A. Yes.

17 Q. And what was that?

18 A. The explanation is that the operator is using
19 three separate doses of chlorine in the treatment
20 train and this is guaranteed to push THM levels up.

21 Q. So that's just what I said, you came up with
22 an explanation that it was operator error; correct?

23 A. Okay.

24 Q. All right. And you didn't discuss the
25 disinfection byproduct sampling results from Broken

1 Bow in your report, did you, sir?

2 A. No.

3 Q. Now, I just want to cover a couple of other
4 small points.

5 You're not a certified engineer, are you?

6 A. No.

7 Q. And you do not consider yourself to be a
8 sanitary engineer?

9 A. I'm not.

10 Q. And you're not certified in any state as a
11 drinking water utility operator; isn't that correct?

12 A. I'm not.

13 Q. Now, there was some discussion with Mr. Page
14 about whether or not the EPA considered embryotoxicity
15 in setting disinfection byproduct standards. Do you
16 remember that?

17 A. Yes.

18 Q. And you said they did?

19 A. Yes.

20 Q. But, sir, the truth is that you're on record
21 as saying that the EPA's protocol for sampling DBPs is
22 part of a cover-up to cover up single sample
23 exceedances; isn't that right?

24 A. No.

25 Q. You've never said that?

1 A. I've never said the word "cover-up," I hope.

2 MR. GREEN: Just bear with me a moment,
3 Your Honor.

4 Q. (BY MR. GREEN) Let me give you your
5 deposition, sir.

6 A. I have both depositions here.

7 Q. Do you? All right.

8 MR. GREEN: Does Your Honor have a copy
9 of the deposition?

10 THE COURT: I don't -- yes, I do. I'm
11 sorry. I've got Volume 1.

12 Q. Okay. I want you to turn to page 206 in your
13 deposition.

14 A. This is Volume 1?

15 Q. Yes.

16 A. Okay.

17 Q. All right. Let us pick up on the text here
18 at line 22 on page 206, and let me ask you whether or
19 not you were asked the following questions --

20 MR. PAGE: Your Honor, before we go, can
21 I just interpose an objection here as beyond the
22 scope? He's being examined here on the very chart and
23 the very type of information that this court sustained
24 an objection on from Mr. Green. So if he's going to
25 go into this, Your Honor, I should be allowed on

1 redirect then to bring that exhibit in and do a full
2 examination.

3 MR. GREEN: May I respond to that?

4 THE COURT: Of course.

5 MR. GREEN: Actually, what I plan to do
6 is, after I ask a few questions, I'm going to make a
7 motion to strike the entirety of Dr. Cooke's testimony
8 for the reasons which I'll articulate at that time.

9 I don't believe that I'm opening the door
10 here to his chart. I'm opening the door to the
11 inherent rationality of his views. This is a -- this
12 is an expert witness who, among other things that I
13 will talk about in a moment, is telling the court that
14 he believes that the EPA is engaged in a cover-up with
15 respect to how it regulates disinfection byproducts.

16 I'm really not invading the table, I don't
17 intend to invade the table, but we're testing now the
18 contours and fringes of his views because I think it
19 goes to the reliability of his testimony and his
20 status as an expert who is deserving of belief in this
21 courtroom. I think that I can test the rationality
22 with that with his own concession on the record that
23 he believes that the EPA is engaged in a cover-up.

24 THE COURT: I see on page 207 where he
25 says, "that's how they" -- referring to the

1 EPA -- "essentially cover up these exceedances." He's
2 not using the term that it is a cover-up. He just
3 says -- he's saying that running averages, as he
4 states later, "means that the utility is not forced to
5 make any kind of changes, they don't have to, and
6 because the guidelines, including running
7 four-quarters average are not only based on health
8 risks but are based upon costs to get it down,"
9 etcetera.

10 I think Mr. Page's point is a good one. The
11 reference to dangers to embryos was solely admitted
12 for the purpose of explaining to the court why DBPs
13 are measured by the EPA. It seems to me we're trying
14 to use a very small crack in the door to get into this
15 area and I understand your attempt to paint Dr. Cooke
16 as an extremist.

17 But Mr. Page is entirely correct, that I
18 think it's an improper use. The objection is
19 sustained.

20 Q. (BY MR. GREEN) Doctor, you did not sit on
21 any of the EPA's committees that considered whether to
22 adopt a standard for cyanobacteria; is that correct?

23 A. Correct.

24 Q. And it is true --

25 A. Excuse me. A standard for cyanobacteria?

1 Q. Yes.

2 A. Could you tell me what that standard is?

3 Q. I'm asking you whether you sat on any
4 committee that considered whether to adopt a standard
5 for cyanobacteria, an EPA committee?

6 A. I did not.

7 Q. Okay. It's true, is it not, that in this
8 country -- tell me if I'm right -- that neither the
9 EPA nor the State of Oklahoma has set regulatory
10 limits on cyanotoxins in drinking water or surface
11 water?

12 A. That's correct.

13 Q. And are you aware that the Safe Drinking
14 Water Act requires the EPA to make periodic
15 determinations on whether additional substances in
16 drinking water should be regulated?

17 A. Yes.

18 Q. And are you aware whether or not the EPA has
19 expressly considered whether cyanobacteria and
20 cyanotoxins should be regulated in drinking water, and
21 they've done this on at least three occasions, in
22 1998, in 2005, and as recently in 2008? Are you aware
23 of that?

24 A. Yes, they have considered that.

25 Q. Okay. And are you also aware that each time

1 when that was considered, the EPA determined that the
2 state of the science still does not support a drinking
3 water standard for cyanobacteria or cyanotoxins?

4 A. I agree.

5 Q. And just a couple more questions on this
6 subject.

7 As far as you know, the State of Oklahoma has
8 not shut down any water treatment utility, water
9 treatment plant on account of microcystin; isn't that
10 right

11 A. To my knowledge.

12 Q. And you've not seen any Oklahoma state
13 Department of Health or Centers for Disease Control in
14 a prevention bulletin reporting any disease outbreaks
15 due to cyanobacteria in Oklahoma in the last ten
16 years?

17 A. I have not.

18 Q. And finally, sir, you have no information
19 that the State of Oklahoma has closed Lake Tenkiller,
20 or for that matter the Illinois River, for swimming
21 due to alleged cyanobacteria problems?

22 A. No knowledge.

23 Q. Okay.

24 MR. GREEN: Now, Your Honor, in view of
25 the certain questions that were asked by Mr. McDaniel

1 and the answers given by the doctor, and in particular
2 the discussion about the flaws in his data and that he
3 had deleted -- I'm quoting from Defendants' Joint
4 Exhibit 694 -- that he had deleted "a lot of stuff
5 where the three of us have mentioned flaws in the
6 work," etcetera, I'm very concerned that all of
7 that -- all of those attendant circumstances do not so
8 rob this testimony of its inherent reliability that
9 it -- that it should be allowed to remain on the
10 record.

11 This is just not a cross-examiner's point.
12 This is, in my mind, a much more serious --

13 THE COURT: It's a serious concern,
14 Mr. Green.

15 I take it, Mr. Page, you did not direct any
16 of the scientists to destroy any of the extant
17 e-mails?

18 MR. PAGE: That's correct, Your Honor.

19 And in this same deposition, Dr. Cooke was
20 asked that and he stated he never did that, he never
21 deleted it all. His testimony under oath --

22 THE COURT: No, no, no. Wait a minute.
23 He never deleted it all?

24 MR. PAGE. No. He didn't delete the
25 e-mails.

1 THE COURT: Oh. Despite his statement
2 in --

3 MR. PAGE: Despite his statement, all
4 his e-mails were produced to the other side, and
5 that's under oath in his deposition.

6 THE COURT: All right. Mr. Green, your
7 response?

8 MR. GREEN: I can only take the words at
9 face -- at face value. It sounds to me when you read
10 that e-mail that that's a pretty bold and
11 straightforward concession that he had deleted
12 material. Plus --

13 THE COURT: Well, because it is
14 important and I need to get to the truth, so let's
15 turn to the e-mail and also turn to the portion in the
16 deposition. I think we need to take this time. This
17 process is one to try to get to the truth. So which
18 exhibit?

19 MR. GREEN: 694, Your Honor.

20 THE COURT: Thank you. All right. He
21 says "I am deleting." He doesn't say, "I have
22 deleted."

23 Let's go to the deposition. What page of the
24 deposition --

25 MR. GREEN: We're looking for it, sir.

1 THE COURT: Thank you. Dr. Cooke, let
2 me just ask you this -- and I expect I know the
3 answer -- but Mr. Page did not tell you to delete any
4 e-mails in which you had discussed opinions relating
5 to the process; is that true?

6 THE WITNESS: Yes, sir, it is.

7 THE COURT: All right. Did you, in
8 fact, delete any e-mails?

9 THE WITNESS: I think I did delete some
10 e-mails.

11 THE COURT: All right. And what portion
12 of the deposition -- I appreciate your candor here.

13 THE WITNESS: And I'd like to explain
14 about what this means.

15 THE COURT: We'll get to that. I need
16 to get to the portion of the deposition here.

17 Mr. Green.

18 MR. PAGE: Your Honor, the portion I was
19 looking at was page 14.

20 THE COURT: In the deposition?

21 MR. PAGE: Yes, sir.

22 THE COURT: Thank you.

23 MR. GREEN: There seems to be two
24 discussions of this, Your Honor.

25 THE COURT: All right. Let me read

1 14.

2 MR. GREEN: I'm looking at Volume 1 of
3 Dr. Cooke's deposition dated the 4th day of December,
4 2008, and I'm looking at pages 14 and 15.

5 THE COURT: Yes, sir. All right. Let
6 me read those.

7 MR. PAGE: And if you would, Your Honor,
8 read 16 also, please.

9 THE COURT: All right.

10 MR. PAGE: And on to 17, Your Honor,
11 please.

12 THE COURT: All right.

13 MR. PAGE: And 18.

14 THE COURT: All right.

15 MR. PAGE: There's a lot of examination
16 on this, Your Honor.

17 THE COURT: I suspect so.

18 MR. PAGE: And also, Your Honor, I found
19 some more references on 236.

20 THE COURT: All right. Thank you.

21 MR. JORGENSEN: Your Honor, the 236
22 reference goes on to 237.

23 THE COURT: Thank you. All right.

24 Mr. Green, how do you propose addressing this
25 matter? Should we focus on this and allow Mr. Page to

1 voir dire the witness?

2 MR. GREEN: I think that that's a
3 perfectly acceptable approach. I do note that the
4 witness is -- my quick assessment of this is he's all
5 over the place. I don't mean to be demeaning here in
6 any way, but the --

7 THE COURT: Well, I'll be the judge of
8 that.

9 MR. GREEN: The sands seem to be
10 shifting, as I see it, and then we have the answer
11 given directly to Your Honor's question that he did
12 delete material. There's also some reference to
13 whether he's -- you know, it's clear that he deleted
14 something. There's movement --

15 THE COURT: He admits that. Let's see
16 if we can clarify that.

17 You know, this is a complicated matter. The
18 world's a complicated place. I mean, we need to
19 pursue the truth wherever it leads us. Let's go.

20 Mr. Green.

21 MR. GREEN: All right. Permit me just
22 to ask a couple of questions.

23 Q. (BY MR. GREEN) Doctor, you have that e-mail
24 in front of you. I've reviewed your deposition
25 testimony here. Tell us, sir, whether or not you

1 deleted e-mail discussions, or for that matter text
2 discussions, or any other kind of material that you
3 may have discarded discussing flaws in the data.

4 A. Let me first define what I used the word
5 "delete" to mean. I think you're considering it to be
6 an active -- an activity to cover up, to eliminate
7 information that would be damaging to any position we
8 might have. In fact, this is normal scientific
9 dialogue between investigators. As testimony
10 yesterday revealed on concentrations of phosphorus in
11 Tenkiller Reservoir, we chose not to use five years of
12 phosphorus data in Tenkiller Reservoir because the
13 method was flawed. We deleted that material from our
14 graphs.

15 THE COURT: But that's different,
16 Doctor, with all due respect. You say here that
17 you're "deleting a lot of stuff where the three of us
18 have mentioned flaws in the work."

19 THE WITNESS: Yes.

20 THE COURT: You know, it's fine in the
21 scientific process to analyze different approaches,
22 but it's another thing entirely to delete references
23 or mentions of flaws in the work. Would you agree
24 with me?

25 THE WITNESS: So --

1 THE COURT: I mean, simply because you
2 talk about potential flaws --

3 THE WITNESS: Right.

4 THE COURT: -- doesn't undermine the
5 eventual approach that you take, but you can't delete
6 mention of the flaws when you've already made them in
7 discussions with one another. Do you understand?

8 THE WITNESS: I understand. I'm afraid
9 I'm being pushed into a corner that I don't believe I
10 got there. We deleted materials that were no longer
11 useful to us; I did.

12 THE COURT: But you say you deleted "a
13 lot of stuff where the three of us have mentioned
14 flaws in the work."

15 THE WITNESS: Yes.

16 THE COURT: What did you delete?

17 THE WITNESS: Well, we -- this is
18 material no longer of any use to us so I discarded it,
19 including the discussions of it.

20 THE COURT: Mr. Green.

21 THE WITNESS: Does that make sense to
22 you, sir?

23 THE COURT: Well, I need Mr. Green to
24 ask questions, Mr. Page to ask questions to see if we
25 can make a determination of what exactly was deleted.

1 Go ahead, Mr. Green.

2 Q. (BY MR. GREEN) This exhibit, Doctor, which
3 is Defendants' Joint Exhibit 694, the one that
4 references your conversation with Mr. Page and your
5 deleting lots of stuff that the three of us have
6 mentioned flaws, that occurred on December 7th of
7 2007; correct?

8 A. Yes.

9 Q. All right. But as you may recall,
10 Mr. McDaniel indicated and took you through a number
11 of e-mails that preceded that date and which occurred
12 as early as October of 2007, where you and Jack Jones
13 and maybe even Dr. Welch are going back and forth
14 about problems with the data; isn't that correct?

15 A. Yes.

16 Q. Okay. So you're obviously concerned about
17 the integrity of the data and whether or not the data
18 that you're using is correct, and those conversations
19 are documented right here in these exhibits?

20 A. Yes.

21 Q. All right. So now we move to December, and
22 when you make a reference to David Page warning you
23 about using e-mails to discuss these things, what
24 things is he warning you not to discuss?

25 A. I do not know what the context of that first

1 sentence was. The next sentence I do understand.

2 Q. Well, don't you -- doctor, would it be unfair
3 for me to assume that what Mr. Page desires you to
4 stop doing is to discuss in e-mails with your
5 colleagues, the other experts in this case, the
6 problems you're having with this data, the flaws that
7 you're having with this data, because like any, you
8 know, sensible lawyer, he'd prefer not to have you
9 entering into these kinds of discussions? Isn't that
10 what he's telling you to do?

11 A. I believe so.

12 Q. Okay. So now we've established that.

13 And so what happens is, is your reaction to
14 that is, by golly, I'm going to go back and get rid of
15 this stuff where we've done just exactly that. And
16 you, perhaps not thinking it through, write an e-mail
17 where you say, "I'm deleting a lot of stuff where the
18 three of us have mentioned flaws in the work."

19 So what you're doing is, you're obviously
20 reacting to the admonition that you received from
21 Mr. Page; isn't that correct?

22 A. No, sir, it's not.

23 Q. Okay.

24 A. And it can't be obvious. The next sentence
25 is an entirely different thought: "I am deleting a

1 lot of stuff where the three of us have mentioned
2 flaws in the work, etc."

3 Q. So this e-mail -- this paragraph that I'm
4 focused on is a collection of disconnected --

5 A. Yes, it is.

6 Q. -- thoughts?

7 A. What's going on at that time, December 7th,
8 we are writing a report with great intensity. We were
9 told that the report was due, final copy, on January
10 4th --

11 Q. Well, let's look at the -- go ahead.

12 A. -- which would be less than thirty days from
13 that point. We hadn't even received all of the data
14 so we're working as hard as we can to write this and
15 we are finding flaws in our analysis. Why keep them?
16 We have better paragraphs, we have better graphs, we
17 have better statements. That's exactly what's going
18 on here.

19 Q. So this is just -- we're just going to get
20 rid of little typos; is that right?

21 A. Not at all, sir.

22 Q. Okay. Let's look at the third thought in
23 this paragraph and see if they connect up.

24 So thought No. 1 -- or portion No. 1, "Dave
25 Page has warned me again about using e-mails to

1 discuss such things," and you and I have just
2 established what that was about.

3 Next thought: "I am deleting a lot of stuff
4 where the three of us have mentioned flaws in the
5 work, etc.," and I've heard your explanation.

6 Third thought: "Maybe you should call me
7 about this."

8 Now, what's that refer to?

9 A. That means simply that; let's talk about
10 it.

11 Q. So let's talk about the flaws rather than
12 sending e-mails about the flaws; is that right?

13 A. Sir, I can't go beyond making an answer that
14 I have. This is two years ago under intense pressure.
15 I cannot remember our thinking.

16 Q. Doctor, let me ask you this.

17 Can you sit in this court and say today under
18 oath --

19 A. Under oath.

20 Q. -- under oath that you did not delete any
21 material, whether it be e-mails, text messages, or
22 discard other material that pertained to the
23 discussion that you were having about flaws in the
24 data?

25 MR. PAGE: Your Honor, he's already

1 testified he deleted some materials, and in his
2 deposition he did also.

3 THE COURT: All right. What we're
4 trying to do is delineate exactly what was deleted.
5 Overruled.

6 Go ahead.

7 Q. (BY MR. GREEN) Let me show you -- do you
8 have page 236 in your deposition there? Can you turn
9 to that?

10 A. Yes.

11 Q. Okay, sir. Now, there's a question -- do you
12 see the question that begins on line 2?

13 A. Yes.

14 MR. GREEN: And I'm just going to take a
15 moment more, Your Honor, and then I will yield.

16 Q. (BY MR. GREEN) That's a question about the
17 same material and same language in this e-mail that
18 I'm talking about; correct?

19 MR. PAGE: No, Your Honor. This
20 is -- he's talking about Exhibit 1, which is his
21 report that's part of the examination. That's a
22 misrepresentation of what's going on here.

23 Q. (BY MR. GREEN) Let me read -- let me read
24 the question and see if I'm understanding things
25 right.

1 Now, the second paragraph -- can you follow
2 along with me? I just want to make sure you see this
3 doctor.

4 A. Well --

5 Q. Now, the second paragraph -- I'm going to ask
6 you about the substance of what you're discussing from
7 a substantive standpoint in a second, but I want to
8 revisit this issue in paragraph 2.

9 It says, "I am deleting a lot of stuff where
10 the three of us have mentioned flaws in the work,
11 etc."

12 Now, is that a reference to this e-mail,
13 Defendants' Joint Exhibit 694?

14 A. It seems to be word for word.

15 Q. It does. It does. And then the interrogator
16 continues: "I believe your testimony was that you
17 never deleted any e-mails; is that true?

18 "ANSWER: I never deleted an e-mail to my
19 knowledge, that's right."

20 Now, with respect to that answer, are you now
21 changing that answer in this courtroom and telling us
22 that you did or may have deleted e-mails discussing
23 flaws in the data?

24 A. I deleted some e-mails, or I may have, but
25 none that discussed flaws in data.

1 Q. All right. Then it says, "Did you
2 develop -- did you delete texts, T-E-X-T-S?

3 "ANSWER: Oh, sure.

4 "QUESTION: Okay, and what's the difference
5 between a text in electronic form and an e-mail?

6 "ANSWER: Oh, you didn't say electronic form
7 because --

8 "QUESTION: Go ahead.

9 "ANSWER: Welch and I neither one of us want
10 to use anything electronic and not because we have any
11 objection to that, but I can't read the screen, and so
12 a great deal of what we did, we exchanged by Federal
13 Express as text, paper, and we did editing . . . and a
14 lot of stuff you would have to scratch out, bad
15 sentence, whatever it might be. A lot of stuff was
16 deleted that way." I'm continuing over on 237.

17 So in addition to some e-mails, you deleted
18 some text messages that discussed flaws in the data;
19 is that right?

20 A. Text messages, no, sir. Text, text, meaning
21 written paragraphs written by us.

22 Q. Written paragraphs. Okay. Did you discard
23 some of those that --

24 A. Yes.

25 Q. -- mentioned flaws in the data?

1 A. No. We -- we discarded flawed paragraphs
2 with flawed data in them.

3 Q. Flawed paragraphs containing flawed data?

4 A. That's correct.

5 Q. All right.

6 MR. GREEN: All right, Your Honor. I
7 think that's probably the extent of what I'm going
8 to --

9 THE COURT: Mr. Page.

10 *(Discussion held off the record)*

11 MR. GREEN: Well, I'll yield for a
12 moment and then --

13 MR. PAGE: Your Honor, may I make a
14 short comment first and then --

15 THE COURT: Let's just get to the
16 testimony, please.

17 MR. PAGE: Okay, sir.

18 **VOIR DIRE EXAMINATION**

19 **BY MR. PAGE:**

20 Q. Dr. Cooke, I want you to explain to the court
21 what was and what wasn't deleted with regard to
22 e-mails first, and then I want to talk about other
23 work that you did in this case where things were
24 changed or as you -- I think sometimes you say
25 deleted.

1 So first, were e-mails deleted, sir?

2 A. Yes.

3 Q. And how were they deleted?

4 A. How, meaning the technique of doing it?

5 Q. Yes.

6 A. The answer is that I had a very limited
7 capacity in my inbox with a server that I used at that
8 time and material was coming at me faster than I could
9 store it. So the materials that I deleted, the
10 e-mails that I deleted were brief letters, a statement
11 back from you saying, okay, we'll call at this point,
12 materials that had no content, no, you know, content
13 at all to them.

14 Q. Okay, sir. Now, do you recall me ever
15 telling you about what you needed to retain in this
16 case?

17 A. Yes.

18 Q. And what did I tell you?

19 A. You told me to retain the materials relevant
20 to this case; that is, the text and data and so
21 forth.

22 Q. Okay. When you deleted some e-mails because
23 your inbox was getting full, your capacity at Kent
24 State, did you delete anything that was material to
25 your evaluation in this case?

1 A. No.

2 Q. Okay. Now, Dr. Cooke, when this issue came
3 up during your deposition, do you recall me asking you
4 to identify every person in this case from which you
5 received or sent an e-mail?

6 A. I recall that.

7 Q. And do you recall that as part of your
8 considered materials, we gathered the e-mails from all
9 those persons to make sure that even if it was
10 deleted, based on a superfluous basis, you still were
11 able to reproduce all of your e-mails to the
12 defendants in this case; is that correct?

13 A. Every e-mail was reproduced.

14 Q. Okay. Now, sir, when you were talking --
15 just recently when you were shown your deposition
16 about some deletions, what were you referring to at
17 that point?

18 A. I mistakenly used the word "deletion." It
19 seems to have a context here that is different than
20 the one we use.

21 When we have text material that we are not
22 satisfied with, it has to go, and we substituted it
23 with something written more -- more appropriately or
24 better. This is a scientific process. It -- you edit
25 and edit and re-edit until you were satisfied?

1 Q. Well, when you were looking at those texts
2 being changed back and forth, was that part of the
3 drafting process for your report that you're referring
4 to there, sir?

5 A. Yes. It's the way I've always done it, 42
6 years of doing it.

7 Q. So would you explain to the court how you and
8 Dr. Welch drafted this joint report?

9 A. Well, since we live more than 2,000 miles
10 apart, we did some of the report in electronic form
11 back and forth, but most of it by mailing through
12 Federal Express texts that we have prepared and we'd
13 each consider them.

14 Q. Okay. And then so when you refer to
15 "deleting," is this where you scratch out and suggest
16 different language?

17 A. That's correct.

18 Q. Okay, sir. And when you say you deleted some
19 data, does that mean you destroyed the data from your
20 considered materials, that it's no longer present
21 there?

22 A. No. The data's still exists, but we were not
23 satisfied with those data for one reason or another
24 and deleted it from the report that we're preparing.

25 Q. And as an example of the deleted data that

1 you referenced here in an e-mail that's been marked as
2 694, would that include the data; for example, the
3 1986 phosphorus data, that you chose not to use
4 because of the HACH data test.

5 A. That is correct. We deleted five years of
6 phosphorus data because of the technique that was
7 used.

8 Q. And just so -- since because the defendants
9 have claimed that you are biased or you're some kind
10 of a radical, I want to ask you --

11 THE COURT: All right. We're getting
12 far afield now.

13 MR. PAGE: Okay.

14 THE COURT: Let's put 694 up here, and
15 particularly the second paragraph. We're getting away
16 from the concern here. The concern is the second
17 sentence here, Doctor, where you say, "I am deleting a
18 lot of stuff where the three of us have mentioned
19 flaws in the work."

20 Now, that's not a reference to the report
21 itself, is it?

22 A. No, it is a reference to the report itself.
23 Flaws in our report.

24 THE COURT: The report itself would
25 contain mentions of flaws in the work?

1 THE WITNESS: "The work" is referring to
2 our report preparation.

3 THE COURT: No, no. Listen to my
4 question. I'm not talking about the work itself or
5 the report.

6 Do you have 694 in front of you, sir?

7 THE WITNESS: Yes.

8 THE COURT: The sentence says, "I am
9 deleting a lot of stuff where the three of us have
10 mentioned flaws in the work."

11 Now you're attempting to explain that away by
12 saying that you're deleting portions of the report
13 itself; correct?

14 THE WITNESS: Yes.

15 THE COURT: But this says, "I am
16 deleting a lot of stuff where the three of us have
17 mentioned flaws in the work"; correct?

18 THE WITNESS: Yes.

19 THE COURT: Do you mention flaws in the
20 work in the report itself?

21 THE WITNESS: No.

22 THE COURT: So this is a mention to
23 something other than the report, isn't it?

24 THE WITNESS: I believe so.

25 THE COURT: So what did you delete when

1 you say you "deleted stuff where the three of us have
2 mentioned flaws in the work"?

3 THE WITNESS: Sir, my only recollection
4 is of deleting materials out of our report that we
5 were unhappy with. I'm sorry that I cannot come
6 otherwise with --

7 THE COURT: Are you trying to tell me
8 that you mentioned the flaws in the work in the report
9 itself that you deleted?

10 THE WITNESS: No, sir. I -- I
11 cannot --

12 THE COURT: We're talking about apples
13 and oranges here, it appears to me, Doctor. You want
14 to say you deleted aspects of the report, but you're
15 admitting that you didn't mention flaws in the work in
16 the report itself; correct?

17 THE WITNESS: I cannot recall the drafts
18 of our report and what it contains.

19 THE COURT: We'll get back to this after
20 a recess.

21 *(Short break)*

22 THE COURT: Mr. Page, any further
23 questions?

24 MR. PAGE: Yes, Your Honor, if I may.

25 Q. (BY MR. PAGE) Dr. Cooke, I want you to pull

1 out Defendants' Joint Exhibit 694, the exhibit we've
2 been looking at.

3 Okay. When was this written, sir?

4 A. December 7, 2007.

5 Q. Okay. And when was your report due at the
6 time -- was your report -- when was your report due
7 based on this --

8 A. January 4th of 2008.

9 Q. So at the time you're writing this report,
10 you're under the deadline that was originally set by
11 the court of January 2004; is that correct?

12 A. Yes.

13 Q. Excuse me. January 4, 2007; correct?

14 A. Yes.

15 THE COURT: 2007.

16 Q. (BY MR. PAGE) 2008.

17 MR. PAGE: Thank you, Your Honor.

18 Q. (BY MR. PAGE) Now, were you writing your
19 report at this time --

20 A. Yes.

21 Q. -- when you're e-mailing this to Mr. Jones?
22 What's the subject matter?

23 A. Subject matter is the total phosphorus
24 chlorophyll regression equation.

25 Q. Okay. Now, the subject matter there, sir,

1 can you tell me what that -- did that relate to your
2 report that you were writing?

3 A. It was key to our report.

4 Q. Okay. And was there actually an exhibit that
5 you provided us in court yesterday in your testimony
6 that showed the 143 reservoirs and you plotted it?
7 Correct?

8 A. Yes. That's our figure 6.

9 Q. And that was what Dr. Jones was helping you
10 with at this moment?

11 A. Yes.

12 Q. Okay. So your first sentence says, "Jack: I
13 need your feedback on this." What are you referring
14 to?

15 A. I'm asking him to respond back to me about
16 our data and a plot on his equation.

17 Q. That was going into the report --

18 A. That was --

19 Q. -- correct?

20 A. Yeah, that was going into the report.

21 Q. Okay. Next sentence says, "I assume that you
22 have seen the graphs that plot Tenkiller summer mean
23 TP and (chlorophyll) on a line developed from your 148
24 Missouri reservoirs."

25 What does that refer to?

1 A. Well, that -- a slightly different thought.
2 His -- he had an equation for -- it's 143. I was
3 wrong at that point. But at any rate, he had an
4 equation based upon those 143 reservoirs that we were
5 considering using.

6 Q. Okay. But that still talks about work you're
7 doing for your report; correct?

8 A. Yes. It -- uh-huh.

9 Q. Okay. "What do you think of the fit?"
10 Does that relate now to this exhibit that
11 you're trying to put together for your report?

12 A. Yes.

13 Q. Okay. "I sent you some graphs of each
14 Tenkiller station using TP and (chlorophyll) data and
15 produced an equation in R^2 . What do you think of
16 those?"

17 What are you referring to there?

18 A. Well, what is -- the sentence says that I
19 used some data from the various stations at Tenkiller
20 Reservoir, plotted them on this graph, and my question
21 was, "What do you think of those?"

22 Q. Okay. So you're still talking about your
23 work in your report?

24 A. On the report.

25 Q. Okay. The next paragraph says, "Dave Page

1 has warned me about using e-mails to discuss such
2 things."

3 What such things are you referring to?

4 A. Well, such things were our discussion back
5 and forth about this graph, his equation, and the plot
6 of our data.

7 Q. Okay. And did that relate to your work on
8 your report?

9 A. Yes.

10 Q. Okay. Do you recall what I asked you to do?

11 A. Well, you asked me to save the data, you
12 know, not to delete data.

13 Q. Okay. Do you recall what I asked you to do
14 with regard to your discussions with Dr. Jones and
15 Welch? Did I ask you to pick up the phone and talk?

16 A. Yes, you did.

17 Q. Was there any issue about timeliness and
18 getting this work done at this point in time?

19 A. The pressure was enormous. We were working
20 12- and 14-hour days.

21 Q. Okay, sir. The next sentence is the one
22 we've had a lot of discussions about. It says, "I am
23 deleting a lot of stuff where the three of us" -- now,
24 who is the three of us?

25 A. Welch, Jones, and Cooke.

1 Q. What's the stuff you're referring to here?

2 A. The stuff is trying to put together a text to
3 describe this relationship.

4 Q. So when you say "deleting," is there another
5 way that some people would use that terminology?

6 A. I think they would not use the word "delete"
7 because that seems to have an electronic component to
8 it. We call it eliminating it and replacing it with
9 something better.

10 Q. Are you referring to your report-writing at
11 this point?

12 A. Yes.

13 Q. Okay. And why would you -- so you're talking
14 about editing the report; is that correct?

15 A. I am.

16 Q. So what flaws are you referring to here in
17 this sentence?

18 A. The flaws mainly had to do with my, let's
19 say, subpar expertise with regard to the development
20 of this equation, in particular this type of
21 statistic.

22 Q. So this relates back to the first paragraph
23 where you're asking Jack Jones to check your equation
24 and whether this is an appropriate fit?

25 A. That's right.

1 Q. Okay. And what work are you referring to in
2 this sentence?

3 A. Well, the overall work is our report, and
4 this specific work has to do with this equation and
5 our chlorophyll phosphorus data.

6 Q. Okay. The next sentence says, "Maybe you
7 should call me about this."

8 What are you referring to? Call you about
9 what?

10 A. Well, I asked him, "Maybe you should call me
11 about this," to discuss my problem with understanding
12 this equation.

13 Q. Are you talking about -- are you suggesting
14 that you get together and talk about deleting flaws in
15 your work?

16 A. No. We're talking about getting the work
17 written so that it's intelligible and actually says
18 what the equation --

19 Q. The next sentence, sir, would you read it out
20 loud and tell us whether that also relates to the same
21 subject matter that was in the subject of this
22 e-mail?

23 A. Do you want me to read that to you?

24 Q. Yes.

25 A. "I want to know whether we can use these

1 graphs to support the idea that stations 01 and 02 are
2 (phosphorus) limited."

3 Q. Okay. So was that again part -- was that the
4 whole subject matter of your analysis for your
5 report?

6 A. That's right.

7 Q. Okay. And would you read the next
8 sentence --

9 A. Excuse me. And it emphasized my -- my
10 failure to understand how the equation worked.

11 Q. Okay. Would you read the next sentence, sir?

12 A. "I agree that we can use them in the sense
13 that we argue the reduction of (phosphorus)
14 concentration should lead less chlorophyll."

15 Q. What does that refer to?

16 A. Well, this was really the thrust of our
17 argument. This equation shows that you reduce
18 concentration, you'll have less chlorophyll.

19 Q. And in the next sentence -- will you read
20 that, sir?

21 A. "It's crunch time on the report so would be
22 grateful for a reply. Thanks."

23 Q. So at this point in time, on December 7th,
24 you're actively writing and re-editing the report to
25 be submitted to the court on January 4th; is that

1 correct?

2 A. That's right.

3 Q. Okay. When you mentioned -- when they asked
4 you about deleting e-mails in your deposition, were
5 you talking about this work in your report?

6 A. I don't recall. I don't believe so.

7 MR. PAGE: Okay. Your Honor, I have
8 nothing further.

9 THE COURT: Mr. Green.

10 **VOIR DIRE EXAMINATION**

11 **BY MR. GREEN:**

12 Q. Just a couple of questions, Doctor.

13 This e-mail, Defendants' Joint Exhibit 694,
14 was the subject of a number of questions on different
15 occasions during your deposition; is that not right?

16 A. I believe so.

17 Q. And it is true, is it not, Doctor, that at no
18 time in any of the explanations that you offered with
19 respect to this e-mail did you testify that the
20 reference to mentioning flaws pertained to the initial
21 paragraph of this e-mail? We've heard that for the
22 first time this morning; isn't that right?

23 A. No, sir.

24 Q. Can you find your testimony where you tell
25 those who are in attendance at the deposition that

1 mentioning flaws pertains to your discussion in the
2 initial paragraph of that e-mail? I'd like you to
3 point me to it.

4 A. I don't know where to look in that. I have
5 page 236 in front of me where this question is brought
6 up, and my question -- the question to me was, "Did
7 you develop -- did you delete texts, T-E-X-T-S?" And
8 I said yes.

9 Q. You were asked, Doctor, were you not, to
10 explain that e-mail on a number of occasions? You
11 were given an opportunity to explain that e-mail on a
12 number of occasions in your deposition.

13 It is true, is it not, that not at any time
14 did you explain that e-mail by coupling the mentioning
15 of flaws in the second paragraph to the discussion in
16 the first paragraph?

17 A. I can't find all of the parts of this e-mail,
18 but I can tell you that I did say -- and I said
19 repeatedly -- that I deleted texts that we believed
20 was flawed.

21 Q. All right. Now, when I walked into the
22 courtroom --

23 MR. PAGE: Excuse me, Your Honor. He's
24 impeaching with the deposition. I would like to call
25 the court's attention --

1 THE COURT: I'm sorry. I'm sorry.
2 These speaking objections and attempts to feed
3 information to the witness are going to stop. If you
4 have an objection as to the form, you may make it.
5 Mr. Page.

6 MR. PAGE: Improper use of the
7 deposition in impeachment.

8 THE COURT: Overruled.

9 Q. (BY MR. GREEN) Now, Doctor when I walked
10 into courtroom this morning -- and I don't mean to --
11 not this morning -- just before we reconvened here,
12 you were conferring with Mr. Page; correct? Is that
13 true?

14 A. Yes.

15 Q. Okay. What were the two of you talking
16 about?

17 A. He asked me to look at page 236 and page 14
18 of the deposition.

19 Q. Okay. And that's the extent of it?

20 A. Yeah. He said, "Take a look at these." I
21 walked back over because I couldn't hear him from here
22 as to what pages.

23 Q. Did Mr. Page suggest to you that you explain
24 this reference in the second paragraph of this e-mail
25 by linking it to the discussion in the initial

1 paragraph of the e-mail in Defendants' Joint Exhibit
2 694?

3 A. Mr. Page said to me that we're going to go
4 through this entire e-mail and understand its
5 context.

6 Q. Okay, sir. And just so that we are
7 absolutely clear of what your present testimony is,
8 Doctor, you are telling the court and those of us in
9 this courtroom that the reference to the three of us
10 mentioning flaws in the work, etc., and deleting a lot
11 of stuff where the flaws are mentioned, pertains to
12 the first paragraph?

13 A. It does.

14 MR. GREEN: Your Honor, I renew my
15 motion and --

16 THE COURT: All right. And because
17 essentially this is redirect as to this question, I'll
18 give -- as to this matter, I'll give Mr. Page the
19 opportunity to rehabilitate.

20 Go ahead.

21 **FURTHER VOIR DIRE EXAMINATION**

22 **BY MR. PAGE:**

23 Q. Dr. Cooke, would you look at page 14 of your
24 deposition, please, sir?

25 A. Okay.

1 Q. And would you take a moment to refresh your
2 recollection and tell me whether your testimony on
3 page 14 and then 15 related to the e-mail at question,
4 sir?

5 A. It refers to the e-mail in question.

6 Q. Okay. And what lines are you referring to,
7 sir?

8 A. I was looking at beginning line 6.

9 Q. Okay. Would you read that, please?

10 A. "I am deleting a lot of stuff where the three
11 of us have mentioned flaws in the work and so forth.
12 Maybe you should call me about this. I want to know
13 whether we can use these graphs to support the idea
14 that Stations 01 and 02 are P limited."

15 Q. Okay. There, you're just reading the e-mail;
16 correct?

17 A. Yeah.

18 Q. And then later on in the deposition at the
19 bottom of the page, you were asked what flaws you were
20 talking about?

21 A. Yes.

22 Q. Would you read your answer to that and see if
23 that refreshes your recollection as to whether you
24 testified on this day concerning the flaws in the
25 e-mail similar to what you just testified to in this

1 court?

2 A. "I wish I could tell you the answer to that.
3 The flaws that would have been mentioned by me were
4 flaws in what we were writing, in other words, is
5 there a better way to conduct a sentence, were there
6 new at that time data that I could have used, was
7 there a reference to work that someone else had done
8 that I should have included. Those are what I called
9 flaws."

10 Q. Does that refresh your recollection as to
11 what you testified on the day of your deposition?

12 A. Yes.

13 Q. And what does that refer to, that testimony?

14 A. Well, it -- what I wrote here about "I'm
15 deleting a lot of stuff" refers to this TP chlorophyll
16 regression.

17 Q. I want you to turn to page 236, sir. I want
18 you to take a moment to read your questions and
19 answers on 236 and 237, and I want to ask you again
20 whether that testimony relates to this e-mail
21 and -- are you talking about this e-mail, sir?

22 A. Yes.

23 Q. And are you testifying there about the
24 editing process on the report?

25 A. Yes.

1 Q. Is that consistent with your testimony you've
2 given under oath today?

3 A. Yes, it is.

4 MR. PAGE: Your Honor, I have nothing
5 further.

6 THE COURT: Very well. With due
7 respect, the motion to strike the testimony of
8 Dr. Cooke will be denied. The arguments obviously can
9 be made with reference to the weight the court should
10 give to the testimony.

11 Any further cross-examination?

12 MR. GREEN: No, sir.

13 THE COURT: Very well. Any further
14 cross-examination from any others. Mr. Elrod.

15 MR. ELROD: I do, Your Honor. At the
16 risk of returning to the mundane issues, Your Honor, I
17 do have a couple of questions.

18 THE COURT: Yes, sir.

19 **CROSS-EXAMINATION**

20 **BY MR. ELROD:**

21 Q. I'd like to talk to you, Dr. Cooke, about the
22 scuba diving part of lake.

23 MR. ELROD: If you could put up, April,
24 please, 747.

25 Q. (BY MR. ELROD) Now, Dr. Cooke, it's true, is

1 it not, that the LK-01 is the sampling point nearest
2 the dam?

3 A. Yes.

4 Q. And there's been testimony in this courtroom,
5 sir, that there has historically been scuba diving
6 activities in that part of the lake. Do you know
7 about that?

8 A. I don't know about that testimony.

9 Q. All right, sir. Let's focus just on that
10 portion of the lake.

11 That would also be the portion of the lake
12 that would have the greatest volume because of its
13 depth and its width at that point; is that true, sir?

14 A. It has the greatest volume.

15 Q. And do you know, as a matter of fact, what
16 total volume of the lake water is represented by
17 LK-01, just that sampling point?

18 A. I don't have it. I think it's right here in
19 this pile of paper.

20 Q. All right, sir. In any event, if we look at
21 just that part of the bar chart for 1974, we see total
22 phosphorus covering just under 30; is that correct?

23 A. Yes.

24 Q. As we move forward in time, for that
25 particular location in 1992, it drops down to about

1 20 -- well, 25, and then in '93 to 24, and then 2005
2 down to 10, and then in 2006 at 12, and then at 2007
3 it's at 11; is that correct, sir?

4 A. Yes.

5 Q. That's the clearest part of the lake, is it
6 not?

7 A. I believe the transparency was the clearest
8 there.

9 Q. And have you seen a copy of the 2009 Lake
10 Tenkiller Visitor's Guide, sir?

11 A. No.

12 Q. Are you aware that it describes Lake
13 Tenkiller as being the cleanest lake in the state of
14 Oklahoma?

15 A. I haven't read it.

16 Q. Or the clearest lake in the state of
17 Oklahoma?

18 A. I haven't read it.

19 Q. I see.

20 MR. ELROD: And if we could look at 754
21 for a second, please, April.

22 Q. (BY MR. ELROD) That's the chlorophyll values
23 for Lake Tenkiller, and, again, if we could just focus
24 on LK-01.

25 As we move across from left to right, the

1 chlorophyll levels at LK-01 are well under the
2 eutrophic line; correct, sir?

3 A. In 1974?

4 Q. As we move from left to right. In 2001, it
5 is right at the mesotrophic line, and then it's lower
6 than the mesotrophic line except for one year
7 thereafter; isn't that true, sir?

8 A. That's correct.

9 MR. ELROD: All right. That's all I
10 have. Thank you.

11 THE COURT: Any further
12 cross-examination?

13 MR. EHRICH: No, Your Honor.

14 MR. CHADICK: No, sir.

15 THE COURT: Very well. Redirect?

16 MR. PAGE: Yes, Your Honor.

17 **REDIRECT EXAMINATION**

18 **BY MR. PAGE:**

19 Q. Dr. Cooke, I want to go back to some
20 testimony you had yesterday about --

21 MR. PAGE: May I have a minute, Your
22 Honor?

23 THE COURT: Yes, sir.

24 *(Discussion held off the record)*

25 Q. *(BY MR. PAGE)* So I want to talk about 1974.

1 Remember the examination -- rather extensive
2 examination by Mr. McDaniel about 1974?

3 A. Yes.

4 Q. Okay. I'd like you to pull out, as you do
5 your evaluation, Oklahoma Exhibit 1090, which was this
6 chart of flow data, I would like you to look at
7 Oklahoma Exhibit 747, which is total phosphorus in
8 Lake Tenkiller, and Oklahoma Exhibit 754,
9 chlorophyll-a, and I've got a few questions to ask you
10 about this, sir.

11 A. I'm not having much luck here.

12 Q. Okay. These were ones that --

13 A. Okay. I have phosphorus, I have chlorophyll,
14 and I have the water flow.

15 Q. Okay. Good, sir.

16 Dr. Cooke, now that you know that there's a
17 storm in 1974, how would you interpret the phosphorus
18 and chlorophyll-a data that you've received?

19 A. The storm, according to the National Weather
20 Service and NOAA, was a storm of the century and the
21 quantity of water was very large.

22 Q. Is that reflected on the flow data that
23 Dr. Engel provided in figure 5.1?

24 A. Yes. His figure 5.1 show this tremendous
25 burst of water in 1974, in June of 1974. There's

1 enough water there to displace over half the volume of
2 Tenkiller Reservoir. When it did that, it washed out
3 more than half the volume of the reservoir, including
4 a lot of algae, meaning that the chlorophyll for June
5 of 1974 would be very low.

6 But it also would mean that a storm of that
7 magnitude -- if I recall, 14 inches of rain fell on
8 Siloam Springs in a matter of a day or so, a
9 tremendous amount of water -- this would have scoured
10 the land and brought in a lot of turbidity and a lot
11 of phosphorus.

12 And so that's exactly what we see here in
13 these graphs, higher phosphorus than you would have
14 expected for the kinds of algae that were present in
15 the reservoir in 1974. Those are algae of an
16 oligotrophic system. We have phosphorus here that's
17 on the borderline of eutrophic and --

18 Q. So you're referring now to Oklahoma Exhibit
19 747 and the 1974 values of total phosphorus?

20 A. Yes.

21 Q. Is it your testimony -- what is the basis for
22 those high phosphorus levels in 1974?

23 A. Those high phosphorus levels were caused by
24 this tremendous storm.

25 Q. Okay. So let's talk a little bit again about

1 the chlorophyll data. When was that storm?

2 A. The storm began on, I believe, June 9th.

3 Q. Okay. Now --

4 A. Could have been June 7th.

5 Q. Okay. So having that knowledge, is there any
6 data during the summer of 1974 that would be
7 representative of the lake for that time for
8 chlorophyll?

9 A. Well, the August data, two months -- more
10 than two months later -- it was mid August -- would
11 probably be a very good representation of what
12 Tenkiller was like in that year.

13 Q. Would you please look at Tyson Defendant
14 Demonstrative 241? It was a printout from your
15 considered materials of all the EPA legacy storm data.

16 Do you recall that, sir?

17 A. Yes. This may take a minute.

18 Q. Well --

19 A. I have it.

20 Q. Okay. And what was the data for August of
21 1974 as represented by EPA? This is a couple months
22 following the storm; correct?

23 A. Yes.

24 Q. So would you direct our attention to what the
25 data showed at different locations in the lake?

1 A. In August -- it was August 30th, 1974 -- at
2 LK-01, the concentration of chlorophyll was 6.6
3 micrograms per liter.

4 Q. And where would that fall on the trophic
5 state analysis from your figure 8 or Exhibit 754?

6 A. A value of 6.6, as we can see from -- that
7 would be Exhibit 754, would put it in the mesotrophic
8 category.

9 Q. Now, based on that June flooding event, would
10 you expect the phosphorus in Lake 1 even in August to
11 be elevated over what would typically be for typical
12 rainfall?

13 A. Yes. Chlorophyll would have returned to what
14 you would expect by that time, two and a half months.

15 Q. Okay. Would you go to the next station, sir?

16 A. It's station LK-02. The concentration was
17 5.7 micrograms per liter.

18 Q. And where is that showed on the trophic state
19 index, sir?

20 A. And 5.7 shows mesotrophic.

21 Q. Okay. And area 3, sir, Lake 3?

22 A. Lake station 3, 6.6 micrograms per liter,
23 which, again, is in the mesotrophic range.

24 Q. And finally lake station 4?

25 A. Lake station 4 had a concentration of 12

7700

1 micrograms per liter, which would put it just into the
2 eutrophic category.

3 Q. Now, is that chlorophyll data consistent with
4 your analysis over the years with regard to 1974?

5 A. It's -- it's completely consistent with the
6 phytoplankton species.

7 Q. Okay, sir. Now, do you remember
8 Mr. McDaniel's examination when he showed you an
9 exhibit that was a markup of one of your charts on
10 total phosphorus and he had the 1986 data in there? I
11 think it's called Tyson Defendants Demonstrative
12 244 --

13 A. I recall it.

14 Q. -- where he added the 1986 data; is that
15 correct?

16 A. Yes.

17 Q. And do you recall where he suggested that you
18 manipulated the data to get the result that you wanted
19 to achieve?

20 A. I recall that he suggested that I manipulated
21 the data.

22 Q. Now, Dr. Cooke, why did you not use the
23 phosphorus data for 1986?

24 A. Those data were developed by a method that we
25 considered to be flawed, and even though it supported

1 our case, it showed a high concentration of
2 phosphorus. We rejected those data because of the
3 methodology.

4 Q. Okay. And what in particular was the flaw in
5 the method? This was the HACH method; correct?

6 A. They were using test kits and they failed to
7 use controls so that they really didn't operate the
8 test kit correctly.

9 Secondly, those test kits are very imprecise
10 so that the range of data that they reported could
11 have been off by a great deal and they would never
12 have known it.

13 Q. Now, looking at this revised chart that
14 Mr. McDaniel provided to you, it does show that using
15 this HACH data that Tenkiller got worse between '74
16 and '86; correct?

17 A. Yes.

18 Q. But then he suggested, did he not, in his
19 questions that you left that out so that you would not
20 be able to show a decrease in current years this
21 decade; correct?

22 A. I believe so. I failed to really understand
23 the charge, it was complicated, and frankly I resented
24 that application that I would manipulate data in any
25 way.

1 Q. Well, let me ask you: Did you eliminate,
2 based on this HACH method, any other phosphorus data
3 from your analysis?

4 A. We eliminated not only that year, but we
5 eliminated 2001, 2002, 2003, and 2004.

6 Q. On the same basis?

7 A. On the same basis.

8 Q. And if you had used that data, what would
9 have shown on this Tyson demonstrative?

10 A. It would have shown a tremendous amount of
11 phosphorus in these years.

12 MR. MCDANIEL: Objection. Excuse me.
13 It's outside the scope of direct. I didn't ask him
14 about those years of data.

15 MR. PAGE: Your Honor, he was asking
16 questions on a trend. He was challenging the doctor's
17 cherry-picking of data. The doctor is testifying that
18 he consistently uses the same analysis. He was asking
19 questions about the trend --

20 THE COURT: I understand. Overruled.

21 Go ahead. Anything further?

22 MR. MCDANIEL: Well, furthermore as to
23 foundation, he asked him what would that data show.
24 Well, that data has not been produced to us, Your
25 Honor --

1 THE COURT: Well, it's not offered for
2 the truth, but rather to respond to your accusation of
3 cherry-picking data.

4 Go ahead.

5 Q. (BY MR. PAGE) Dr. Cooke, what did that data
6 show?

7 A. Those data showed that there was a very high
8 concentration of phosphorus in those years.

9 Q. And was this data part of your considered
10 materials?

11 A. I believe it was. We reported the Army Corps
12 data, so yes, it was.

13 Q. Now, do you recall this exhibit -- it was
14 Defendants' Joint Exhibit 427 -- where Mr. McDaniel
15 asked you about the third page about the HACH data --

16 A. I recall that.

17 Q. -- that was being used by the Water Watchers
18 Program.

19 I think you testified about this but I'm not
20 sure if I understood it correctly. Looking just at
21 this document, does this indicate that the Oklahoma
22 Water Resources Board when it collects phosphorus data
23 for its BUMP reports or analysis of water quality in
24 its BUMP reports for lakes, does it use the HACH data?

25 A. That paragraph specifically says it does not

1 use the HACH procedure, but instead takes their data
2 to their own laboratory. Using the HACH test kit to
3 determine total phosphorus is a good way to head for
4 trouble.

5 Q. Okay. Now, Dr. Cooke, do you remember
6 Mr. McDaniel's questions concerning the plankton net
7 that was used in 1960?

8 A. I recall.

9 Q. Did you do any investigation to determine
10 whether or not the plankton net would be capable of
11 gathering the blue-green algae that you testified show
12 the change in trophic state of Lake Tenkiller?

13 A. I did.

14 Q. And what did you find?

15 A. Well, I used two sources to investigate that.
16 One, my own personal experience, and the other just a
17 basic common textbook about algae, here's what you
18 find.

19 The mesh size of that plankton net is 64
20 microns, which is very fine. The size of blue-green
21 algae colonies and filaments can range up to a
22 thousand microns in size, many of them well over a
23 hundred in microns in size. In diameter, maybe three
24 to five microns. But then that's like, you know,
25 throwing a spear through a hole at a hundred meters.

1 So some of the cells might have slipped through those
2 holes, but the vast, vast, vast majority, if they had
3 been there, would have been caught.

4 I have sampled literally thousands and
5 thousands of plankton samples in my career using that
6 particular plankton net, and many of those were in
7 lakes and reservoirs that were not very productive and
8 the net comes up clear.

9 In the productive reservoirs, the nets clog.
10 You can't use a plankton net in a eutrophic system.
11 The net is so clogged with blue-green algae that no
12 water passes through.

13 Q. So is it your opinion, sir, that the 1960
14 sampling that you relied upon and the net they used,
15 if there were this problem of blue-green algae, they
16 would have collected and identified?

17 MR. MCDANIEL: Objection; leading.

18 THE COURT: Sustained. Rephrase.

19 Q. (BY MR. PAGE) Do you have an opinion as to
20 whether or not the blue-green algae that you
21 identified to show a trophic state to eutrophication
22 would be collected by the algal nets that were used by
23 the 1960 sampling?

24 A. Yes, they would have been.

25 Q. So why is that?

1 A. Because they're so big that they would not
2 have gone through the mesh.

3 Q. Now, Dr. Cooke, I want to turn now with you
4 to Oklahoma Exhibit 649 which you were asked about.
5 It was part of your produced materials. It's a paper
6 in hydro --

7 A. Hydrobiologia.

8 Q. Thank you, sir. And it's called, "Predicting
9 Cyanobacteria Dominance in Lakes." Do you have that,
10 sir?

11 A. I have it.

12 Q. Did you use this report as part of your
13 evaluation in this case?

14 A. No.

15 Q. Okay. Did you actually -- part of your
16 considered materials this report's there; correct?

17 A. Let's see if we have the same report.
18 Comparison of sampling and analytical methods.

19 Q. No, sir.

20 A. I'm sorry.

21 Q. This is what has your -- it's called,
22 "Predicting Cyanobacteria Dominance in Lakes."

23 A. Yes. I have that in front of me.

24 Q. Okay. Now, let me ask the question again.
25 Did you use this as part of an analysis for your

1 report?

2 A. Yes.

3 Q. How did you use it?

4 A. We used the graphs that are on page 1906, and
5 in particular we used graphs B and E, and they're
6 reported as figures 14 and 15 in our report.

7 Q. Now, do you remember Mr. McDaniel's questions
8 concerning the regression analysis from this report?

9 A. I do.

10 Q. What was important to you from this report?

11 A. What's really important here, if you examine
12 this figure B -- and this is the one in which he asked
13 me a question -- is that at 30 micrograms total
14 phosphorus concentration, if you look at this, you
15 will see that there is a shoulder on that slope at 30
16 micrograms.

17 Q. What do you mean by a shoulder?

18 A. That is the -- the line goes up quickly at
19 that point. In other words, there's a sharp upswing
20 of the trend at 30 micrograms. At that point at 30
21 micrograms, there's quite a range of cyanobacteria
22 biomass.

23 But above that, as that line goes up -- and
24 it goes up very sharply -- this is an exponential
25 increase in cyanobacteria volume, that you can see

1 that there's no other points below the line. The
2 range may going up as high as one hundred percent
3 cyanobacteria.

4 Q. Would this jump up in cyanobacteria at 30
5 micrograms per liter phosphorus affect the regression
6 analysis?

7 A. Yes.

8 Q. How so?

9 A. Well, it would -- it changes the regression
10 analysis significantly. It makes a significant
11 slope.

12 Q. So what do scientists, such as yourself --
13 how do they identify this sharp up-tick? Is that
14 called a particular term in the scientific world?

15 A. There may be a term that I right now can't
16 generate it.

17 Q. Have you ever heard the word "threshold"?

18 A. It is a threshold clearly.

19 Q. And what does that mean?

20 A. Well, that means that there's a jump there,
21 that there's a shoulder in the data above which
22 there's a rapid change.

23 Q. So does that mean there's a rapid growth in
24 the amount of algae, even though there's only now
25 minor additions of phosphorus being added?

1 A. This is the essence of eutrophication, is
2 that there is a jump -- I mean a jump -- from the
3 mesotrophic state into eutrophic. Reversal of that
4 status is very difficult, and that's what this graph
5 is showing.

6 Q. Okay. Dr. Cooke, I've just got one more
7 question.

8 Do you remember being handed this group of
9 pictures?

10 A. Yes.

11 Q. Have you seen this before?

12 A. It's in Dr. Horne's report.

13 Q. And how does he use this group of pictures in
14 his report?

15 A. I believe he uses that --

16 MR. MCDANIEL: Objection; that is
17 clearly outside the scope. I merely asked him if he
18 had seen the pictures and asked him what he saw as far
19 the color, not anything about Dr. Horne's analysis.

20 MR. PAGE: Your Honor, Dr. Horne uses
21 this to support the --

22 THE COURT: Well, I'm tired of testimony
23 from attorneys. The objection's overruled.
24 Mr. McDaniel brought it up. Mr. Page is entitled to
25 go through it.

1 Go ahead.

2 Q. (BY MR. PAGE) How does Dr. Horne use this
3 data?

4 A. He uses it as evidence that Broken Bow
5 Reservoir is dystrophic.

6 Q. And what does he particularly focus on?

7 A. The color of the water in the -- behind the
8 prop of the boat.

9 Q. He's looking at the wake?

10 A. Yeah. And the wake.

11 Q. Are you aware of any scientists anywhere in
12 the world that has ever used the color of the wake to
13 determine whether or not a lake is dystrophic or not?

14 A. You don't do it that way; no one does.

15 Q. Okay. Now, have you evaluated whether or not
16 Lake Tenkiller is dystrophic?

17 A. Lake Tenkiller is not dystrophic.

18 Q. You evaluated whether or not Broken Bow Lake
19 is dystrophic?

20 A. And Broken Bow is not dystrophic either.

21 Q. Did you use a motor boat wake to determine
22 your analysis?

23 A. I looked at the BUMP reports year after year.
24 There, they tested both reservoirs for what is called
25 true color; that is, they actually took a water

1 sample, went to the laboratory, and analyzed the
2 water. In every case, they report that neither
3 reservoir has color.

4 Q. Okay. And is that a traditional test for
5 dystrophy; that is, the color values?

6 A. What Dr. Horne did is what they call apparent
7 color, what you and I might say to your neighbors,
8 gee, the water looks a little brown today or
9 something. There's no measurement there. What they
10 determine is what scientists call true color.

11 Q. And is that the traditional test for
12 determining whether or not a waterbody is dystrophic?

13 A. That is the true test for determining it.

14 Q. And is it based in NTUs? Is that the
15 nomenclature that you would see in the BUMP report?

16 A. No. It's -- excuse me. I'm sorry. It's
17 based on what's called platinum units.

18 Q. Okay. And is that described in the BUMP
19 reports for both lakes?

20 A. Yes, it is.

21 Q. And what do the BUMP reports find?

22 A. The BUMP reports find that the mean color for
23 Tenkiller is 11 platinum units, which would mean
24 almost no color. The mean color for Broken Bow -- I'm
25 struggling -- I think it's 14 platinum units. So

1 they're not significantly different. Neither
2 reservoir is colored.

3 Q. The color that would come from a dystrophy;
4 correct?

5 A. Yes. They're not dystrophic.

6 MR. PAGE: Your Honor, I have no further
7 questions.

8 THE COURT: Recross?

9 MR. MCDANIEL: No further recross, Your
10 Honor.

11 THE COURT: Mr. Green.

12 MR. GREEN: No, sir.

13 THE COURT: Mr. Elrod.

14 MR. ELROD: No, Your Honor.

15 MR. EHRICH: No, Your Honor.

16 THE COURT: Very well. You may be
17 excused.

18 THE WITNESS: Thank you, sir.

19 THE COURT: Well, we're sitting here at
20 ten minutes of twelve. What's your preference,
21 Mr. Page?

22 MR. PAGE: It's up to you, Your Honor.
23 Either way.

24 THE COURT: Well, let's take our
25 lunch. We'll go an hour and fifteen. We'll be

1 back at 1:05.

2 (Lunch recess was taken)

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C E R T I F I C A T E

I, Brian P. Neil, a Certified Court Reporter for the Eastern District of Oklahoma, do hereby certify that the foregoing is a true and accurate transcription of my stenographic notes and is a true record of the proceedings held in above-captioned case.

I further certify that I am not employed by or related to any party to this action by blood or marriage and that I am in no way interested in the outcome of this matter.

In witness whereof, I have hereunto set my hand this 8th day of December 2009.

s/ Brian P. Neil

Brian P. Neil, CSR-RPR, CRR, RMR
United States Court Reporter